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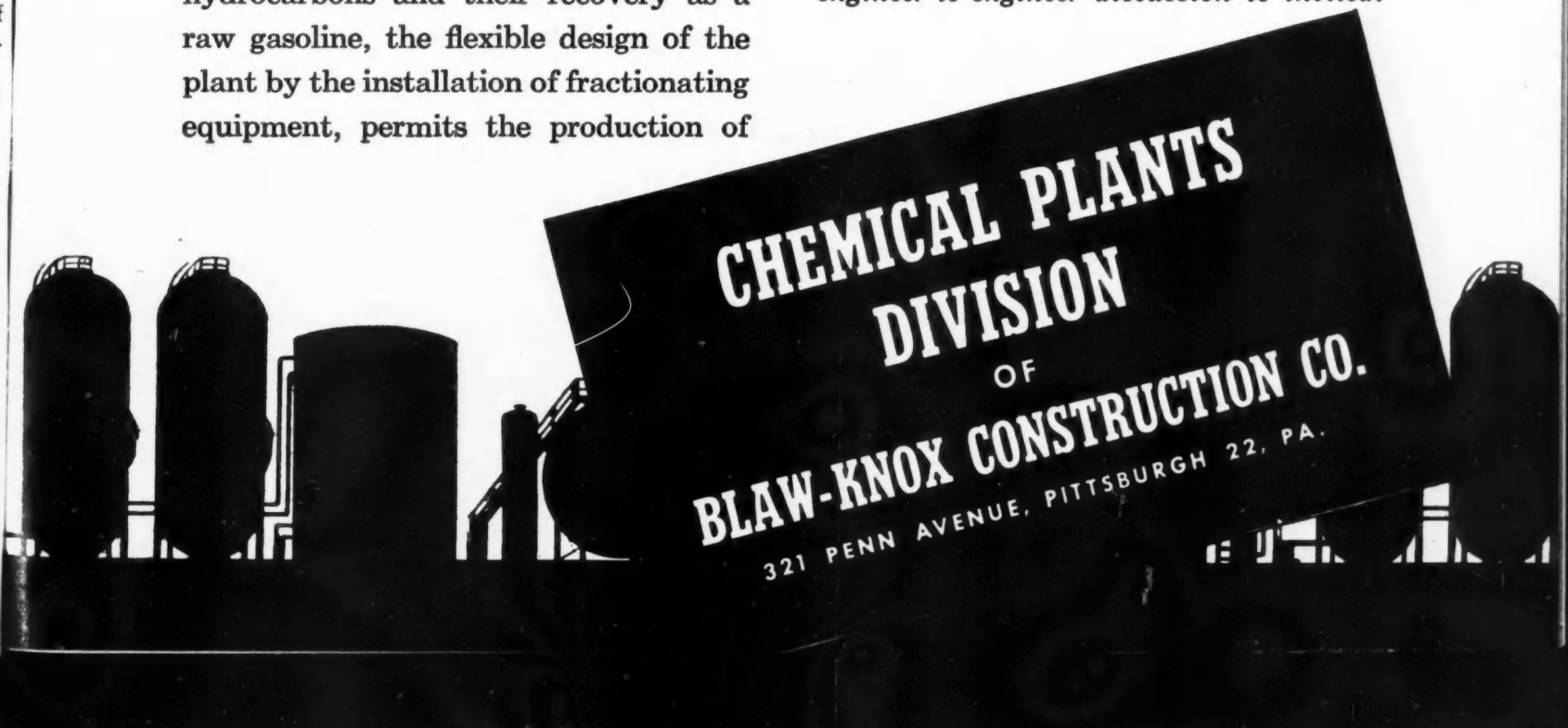
★ ★ ★

The above is illustrative of the modern creative engineering approach of Blaw-Knox. In addition to complete plants Blaw-Knox supplies process equipment and machinery. An engineer-to-engineer discussion is invited.



ADVERTISERS

Aluminum Co. of America	89
American Cast Iron Pipe Co.	10
American Meter Co.	12, 13
American Radiator & Standard Sanitary Corp.	56
American Recording Chart Co.	72
Anchor Petroleum Co.	68
Automatic Products Co.	66
Barrett Division	—
Beacon Petroleum Co.	—
Blaw-Knox Co.	1
Bowser, Inc., Incineration Division	76
Cast Iron Pipe Research Association	6, 7
Cleveland Trencher Co., The	—
Columbia Gas System, Inc., The	93
Connelly, Inc.	78
Coody Bender Co., Inc.	100
Cooper-Bessemer Corp., The	97
Crane Co.	16
Detroit Brass & Malleable Works	—
Detroit Lubricator Co.	—
Dowell, Inc.	85
Dresser Industries, Inc.	3, 15, 64
Dresser Manufacturing Division	3
Empire Stove Co.	55
Fisher Governor Co.	—
Fluor Corp., Ltd.	—
Gas Machinery Co., The	28
General Controls	Third Cover
General Gas Light Co.	59
Goldak Co., The	104
Greenlee Tool Co.	—
Hamilton Manufacturing Co.	—
Handbook Butane-Propane Gases	63
Hardwick Stove Co.	75
Hays Manufacturing Co.	4, 5
Henderson Furnace & Manufacturing Co.	62
Hydrauger Corp., Ltd.	—
Jaeger Machine Co., The	76
Johns-Manville Corp.	71
Kaiser Steel Corp.	99
Kitson Division, The Welsbach Corp.	74
Koppers Co., Inc.	14
Longhorn Industries	61
Master Tank & Welding Co.	94
Mid-Western Engine & Equipment Co.	—
Milwaukee Gas Specialty Co.	51
Minneapolis-Honeywell Regulator Co.	73
Mueller Co.	26
National Tube Co.	20
Natural Gas Odorizing Co.	11
Nordstrom Valve Division Rockwell Manufacturing Co.	86, 87
Norton-McMurray Manufacturing Co.	65
Norwalk Valve Co.	70
Oronite Chemical Co.	18
Pacific Gas Corp.	78
Peerless Manufacturing Corp.	77
Phillips Petroleum Co.	17
Pittsburgh Equitable Meter Division Rockwell Manufacturing Co.	8, 9
Porter Co., Inc., H. K.	24
Reliance Regulator Division	Second Cover
Reynolds Gas Regulator Co.	63
Robertshaw-Fulton Controls Co.	Front Cover
Roots-Connersville Blower Corp.	64
Security Manufacturing Co.	67
Servel, Inc.	—
Sharples Chemicals Inc.	—
Skinner Co., M. B.	91
Sprague Meter Co.	—
Stacey Manufacturing Co., The	70
Standard Pipeprotection, Inc.	82
Stauffer Manufacturing Co.	79
Titan Valve & Manufacturing Co.	—
Toledo Pipe Threading Co.	23
Tulsa Pipe Coating Co.	104
U. S. Pipe & Foundry Co.	—
United States Steel	20
United Petroleum Gas Co.	76
Vulcan Proofing Co.	69
Wachs Co., E. H.	—
Walworth Co.	103
Warren Petroleum Corp.	Fourth Cover
Webster Engineering Co.	—
Western Supply Co.	101
Whittington Pump & Engineering Corp.	77
Williamson Inc., T. D.	102

GAS

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Twenty-Fifth Year of Publication

November, 1949 **Vol. 25—No. 11**

COMMENT

Highlights 19

Thermally Thinking, *by Edward Titus* 23

Technical Trends, *by Guy Corfield* 25

Promotional Notes and Notions, *by Stanley Jenks* 27

ARTICLES

Low Cost Manufactured Gas, *by Robert Kyle* 29

Battery-Controlled, Holderless Propane-Air System Operates for New York Utility, *by Paul E. Peacock Jr.* 34

How Natural Gas Yields Organic Chemicals 37

Holders: Conventional, Pipe, and Bottle Types, *by F. A. Hough, W. C. Mosteller,* and *R. O. Randall* 39

Company Drills 10,000 Ft, Finds Gas—At 7000 Ft, *by C. J. McMahan* 43

Gas Flame-Hardening of Large Gears, *by Paul A. Furkert* 44

Gas Does its Part for Thirsty Chicagoans, *by William Helme* 46

Giant Gas-Fired Kilns Labor for Permanente 48

Pinpointing Technical Data is Company Library's Job, *by Roman L. Pijanowski* 50

Adapting Lab Burners for Natural Gas 52

Milwaukee Clears Services With "Vacuum Cleaner" 53

Gas Future: Double and Double Again, *by Edward Titus* 54

Pipeline Section 81

Repairing Leaks on the California Section of the Texas Pipeline, *by J. A. Millen* 83

Panhandle Operates Automatic Feed Compressor Station Unit 92

Pipeline Operating Ideas and Equipment 95

Pipeline News 96

DEPARTMENTS

Associations	54	People	71
Calendar	58	Catalogs	76
News	60	Current Reading	78
Sales Slants	69	New Products	79

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Highlights

TOM MCGRATH GLOATS. The general counsel for the Fuels Research Council, a familiar figure at FPC hearings, claimed a victory over gas forces last month in a report before the National Coal Assn. convention. The council's objections to "unjustifiable" invasion of areas where coal is "adequate" and where "we had reason to believe that the purported supply of natural gas would be insufficient to meet standards prescribed by the commission" caused the commission to scrutinize more closely availability of reserves in recent cases, he said. The FPC has not yet publicly thanked Mr. McGrath for his assistance.

NONETHELESS, NATURAL GAS ISN'T LICKED YET. Space heating bans continue to be swept away in a rush of natural gas to needy areas. This isn't helping coal's market outlook any, so Mr. McGrath will have to redouble his efforts.

AND ERNEST O. THOMPSON IS STILL ON OUR SIDE. Last month the Texas commissioner was quoted as favoring export to other states. Thousands of gas wells in Texas are still capped for want of a market," he said; "a man has just as much right morally and legally to sell his gas as he does to sell his oil in the open market. We rejoice when we get a new line laid to the north to market our oil . . . If a city wants a gas reserve . . . let it buy and save some gas reserves just as it does a water supply."

CANADIAN GAS EXPORT PROPONENTS STILL OPTIMISTIC. Norman Whittal, director of Westcoast Transmission Co., one of the companies which wants to carry gas from Alberta to the northwest U.S., said last month he expects approval of his company's application by Dec. 12. This despite the previously reported opposition of Alberta officialdom.

HANRAHAN QUITS SEC. The chairman of the Securities and Exchange Commission, 44-year-old New York lawyer Edmond M. Hanrahan wanted to go back to private life. Edward T. McCormick of Arizona, an SEC employee, was given President Truman's nomination to serve out the rest of Mr. Hanrahan's term, which expires in 1952. Donald C. Cook, assistant director of the division of corporation finance, was named to another commission vacancy, to serve until 1954.

WANT TO SELL MORE COAL? THEN PROMOTE GAS AND ELECTRICITY. That's what Clyde Williams, director of Battelle Memorial Institute, told coalmen at their national convention last month. Support research to develop new uses and promote uses not yet widely accepted which will increase consumption of these forms of energy derived from coal was his advice. Heat pumps, agricultural dehydrators, bus and railway electrification, stadium heating were some applications suggested.

DISSOLUTION OF PHILADELPHIA CO. UPHELD. The U.S. court of appeals has stood behind an SEC order directing the Pittsburgh holding company to divest itself of gas and transportation interests. The order, issued in 1947, reduced Philadelphia Co.'s holding to electric only, stripping it of major gas utilities in Pennsylvania, West Virginia, and Kentucky.

WALLGREN SUCCEEDS OLDS ON FPC. After the Senate last month refused to confirm the third-term reappointment of the controversial Leland Olds, President Truman's substitute appointment of Mon C. Wallgren, former senator from Washington, made the grade, 47 to 12. Mr. Wallgren early this year was turned down for a National Security Resources Board post. A close friend of the president's, he is expected to team up with the Buchanan-Draper faction.

RECOGNITION OF STOCKHOLDERS' OBLIGATION FORESEEN. If the California Public Service Commission approves Southern California Gas Co.'s application for a rate raise, it will simultaneously be bulwarking the position of the small, conservative investor. SoCal needs the extra revenue to attract and hold equity capital.

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the Browns are next!

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THERMALLY THINKING

By EDWARD TITUS

television blitz

IT'S TELEVISION AGAINST THE FIELD. And look to your laurels . . .

It seems about time to review in this space the progress of an industry that's challenging every other way of the consumer spending his or her dollar in this country today.

May the best man win, and all that sort of thing. But here's an authentic instance of how it's affecting the gas industry:

A family was all set to buy a new gas range. Ma had decided on exactly what make and model. Then Pa and son came along and decided they wanted a television set. So Pa and son won out, two to one.

Until recently we were in the era when women were determining umpteen per cent of family purchases, whether it was trips to Europe, a new car, or household appliances. Now we're starting a half decade when Pa and the kids are teaming up and buying television sets.

The above story actually is true, and doubtless repeated in thousands of instances throughout the country.

Here's another we've heard, probably a gag, but anyway, it illustrates the point:

A man had $25 to spend, and he had to decide whether it would be a down-payment on a television set or a badly needed new pair of glasses. He got the television set. It was fine for the kids, but he himself had to go without the glasses and had trouble seeing the entertainment.

Here in television is a thoroughly American and thoroughly fair challenge to those who sell gas appliances. It merely points up the necessity of really selling.

There are plenty of reasons why it's more sensible for a family to buy a new gas range or water heater or refrigerator than a television set, if they can't buy both. The appliances of the gas industry are permanent fixtures. They will be useful ten years from today as today, and the chances are, hardly out of date at all.

How obsolete will a television set bought today be ten years from now?

That's a fine $64 question.

We don't wish hard-working television salesmen any hard luck. We couldn't wish them any hard luck if we tried. They're bound to have luck, because that's in the cards. But gas appliance marketers will be wise if they take the measure of this gargantuan new competitor and try to figure ways that they can persuade the American family to take care of its essential needs for a good kitchen to provide better food and more economy before taking care of the urge for entertainment.

It all emphasizes the sort of thing that Frank Nugent pointed out in his Cleveland speech (at the Domestic Research and Utilization conference) last spring—that competition for the consumer's dollar works a lot of different ways. It's not only one manufacturer in the gas industry against another. It doesn't stop by a long shot when gas appliances compete in the consumer's kitchen with other appliances and other fuels. The competition continues at every level of government on the kind of codes and regulations adopted.

It extends right through to competition for what kind of satisfactions the American family is going to seek first—whether the satisfaction of a good vacation, some theater tickets, a new car, or entertainment in the home.

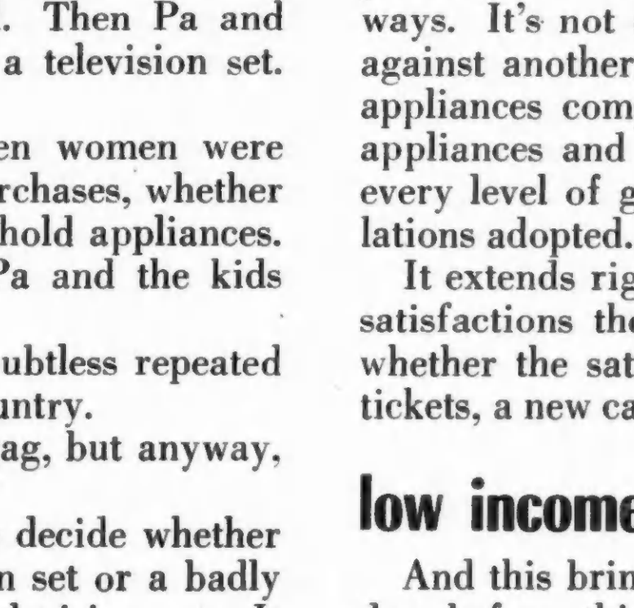
low income appeal

And this brings up a point. Everybody we talked to the day before this was written agreed that the most phenomenal thing about television is the way it's going over with the very lowest income group.

One person who had been investigating the picture in a large eastern city said television aerials were sprouting most rapidly in the least well-off areas.

A taxi driver in New York (perhaps in the lower middle income group) started talking about it, without being asked. His brother and he and their wives and children share an apartment in the Bronx. They've chipped in on a down-payment on a TV set. The reason is to keep the kids in off the streets and out of trouble.

At the other end (the top end) of the financial scale, the idea of television is going over, but not as rapidly as one might think. Another friend mentioned a very wealthy friend of his who hasn't bought a set, wouldn't have one in the house.



So that the gas industry can know what it's fighting, here's the argument most effectively used, we're told, on people in the low income groups:

"How much money," asks the television set salesman, "are you spending sending the kids to the movies?"

Pa adds up and decides it's two or three dollars anyway, per week. That will just about cover payments on a set, and the argument is that at the end of the payment time the family will own it clear and the parents can enjoy it too. So the sale is made.

Accurate figures on the television industry are difficult to obtain. The picture is changing fast. The consensus is that retail value of sets sold during 1949 will come close to $1 billion. That will be two or three times as high as 1948.

Here are a few more facts and figures:

Average cost of sets sold this spring was around $385. Average prices are coming down, and it's estimated that at the end of this year the average set sold will cost about $300. A very popular set in the East sells for about $200 . . .

see how it grows

A Washington official estimates that half a decade from now there will be nearly 20 million television sets in use and more than 500 stations.

Approximate figures on sets produced follow:

1946	6,500
1947	175,000
1948	975,000
1949 (estimated)	more than 2,500,000

About six-sevenths of the sets installed are east of the Mississippi . . .

Because of problems of broadcasting, ownership of sets tends to concentrate so far around large centers of population . . .

New York has 800,000, Los Angeles a couple of hundred thousand, with Chicago and Philadelphia in between . . .

Percentage rise in ownership is higher in the lowest than in the highest income groups . . .

Television may be a boon to keep the kids at home and off the street, but it sometimes works a hardship on mother in providing food and entertainment when the whole neighborhood converges . . .

Constructive side of the picture from the point of view of every consumer manufacturing industry is that the public, according to government figures, has money to spend if it can be persuaded to dig down and spend it. Due to caution and recession early this year, there is a $4 billion increase in the backlog of savings today compared with 1948 . . .

Welcome to TV, a strong and fair competitor for the consumer's dollar under the American system of free competition!

P. S. A point in its favor is that a lot of gas companies are starting to make good use of TV, public relations-wise.

draw a deep breath

THE CAREER OF LELAND OLDS as a Federal Power Commissioner appears to be at an end. The decisive vote of the Senate against him would seem to settle that. Afterwards, the President himself, while deploring the Senate's action, put the kibosh on the idea of a recess appointment for Mr. Olds after Congress had adjourned by stating this would not happen in view of the turn-down by the Senate.

In retrospect, it is of interest to note that while quite a number of New York educators, etc., journeyed to Washington to testify for Mr. Olds, about the only business group that came out for him was in the coal industry.

It is an amazing phenomenon of American life today the way whole groups of people can be swayed by little minorities holding office. We know some coal men, and knowing them, doubt if they really would have wanted their association to endorse Mr. Olds if they knew the facts or had taken the trouble to read the letter written to Mr. Truman by Sen. Ed Johnson, head of the Senate Commerce Committee.

remembrance of things past

Here are a few quotes from Mr. Olds' writings back in the 20's, which Senator Johnson cited to the the President:

"Capitalism in the United States is rapidly passing into the stage which has marked the decay of many earlier social orders, the stage in which a dominant owning class ceased to perform a function in the business of society. * * * The owners exist only, a privileged class of parasites whose idleness and dissipation become an increasing stench in the nostrils of the people.

"The manipulation of democratic institutions by this wealthy autocracy forces labor to seek other than constitutional processes.

"Here is certainly a breach which may widen until the sanctity of private property in the capitalist sense follows the divine right of kings into discard. Inevitable changes in the economic organizations of society are exposing it as just another myth preached in the interest of a small class seeking to retain power and privilege.

"The opposition of the United Mine Workers to competitive wages can only be made effective through the elimination of competitive private capitalism. The miners have two alternatives: to develop, along with the rest of organized labor, political power sufficient to put over nationalization, or to seek control by the workers themselves under a worker government.

"Lenin knew what would take the place of political partyism when he made his bid for power in Russia with the slogan 'all power to the Soviets' . . . That change is coming in America. Upon labor's advance preparation will depend its share in the new apportionment of authority.

"To millions of workers slaving throughout the world to provide the tribute exacted by the American dollar empire the 4th of July will loom as anything but the birthday of liberty. They will view it as the day set apart by the world's greatest exploiters to glorify their rise to power."

johnson fears facade

Commenting on these quotes from Mr. Olds, Senator Johnson said:

"The committee found Mr. Olds glib of tongue and very convincing. Like many crusaders for foreign ideologies he has an attractive personality and is disarming to a very high degree."

It isn't a question whether Mr. Olds had a right to express the above views. Under the American system, he certainly had the right, and still has the right. The question is whether his views have changed enough to make it suitable for him to sit on a commission where he virtually acts as a judge over a great industry.

If it had been put to a vote of the individual coal men, with all the facts before them, would they have favored Mr. Olds? We doubt it.

It would be about as if the American Gas Assn. had been polled in Chicago last month, and adopted a resolution that John L. Lewis is a swell guy. To be sure, he is a good salesman for gas heating, but the AGA wouldn't perpetrate that on the coal industry.

TECHNICAL TRENDS

by Guy Corfield

a new storage method?

A DEVELOPMENT THAT IS being watched with interest is the proposal by J. F. Pritchard & Co. and Floridin Co. to store natural gas in fullers earth.

It is claimed that one volume of fullers earth will adsorb 200 volumes of methane at —250° F. The adsorption is accomplished by passing the refrigerated gas upward through the adsorbent, some of the gas being retained and the remainder passing through and carrying with it the heat of adsorption; this gas is again refrigerated and introduced at the bottom until finally, by successive cycles, the entire adsorbent is saturated and it is only necessary to maintain the bed at refrigeration temperature. Desorption is accomplished by a reversal of this cycle, the gas being readily released by a rise in temperature of the adsorbent.

It is further estimated that 50 MMcf of gas would require 4375 tons of fullers earth that would cost $250,000, and that the overall refrigeration requirements would be about the same as those for liquefaction.

low-cost oil gas

ELSEWHERE IN THIS ISSUE is an article entitled "Low-Cost Manufactured Gas," by Robert Kyle of the Gas Machinery Co., which discusses some of the economics and technical details of production of high-Btu oil gas from fuel oil by the regenerative generator process. This article intimates that if fuel oil remains at its present low price it may be more economical to make high-Btu oil gas on the East Coast than to transport natural gas there from the Mid-Continent . . . or at least more economical to carry a large percentage of the winter peak load with high-Btu oil gas rather than natural gas.

The current information that one can obtain from oil journals, newspapers, and conversations with oil men serves only to indicate the state of confusion that seems to exist. As a blanket statement in one of its leading publications the oil industry feels that the present situation is a "maladjustment" and that influences of production, refining and sales must and will be readjusted to a point which will produce an increase of about 50 cents per barrel over the present posted prices for crude oil, with corresponding increases in the cost of the various products and residues. Meanwhile, the following phenomena, opinions and possibilities are to be observed:

California fuel oil is being shipped to the Atlantic seaboard.

Some South American crude oil is being imported to the Texas Gulf Coast, and a lesser amount to California, and domestic gasoline is being shipped from the Gulf Coast to California and being sold in "serve-yourself" stations.

To some degree existing oil refineries can operate without producing any residue fuel oil, and others are being modified to this end, but this increases the cost of refining.

Except on the sea coast and navigable rivers, a surplus of fuel oil at one point does not alleviate a shortage at a distant point because railroad transportation, or pipeline handling of heavy fluids, is relatively expensive; therefore a surplus in the Mid-Continent does not necessarily mean cheap fuel oil on the East Coast.

The oil heater industry expects to sell 540,000 power-driven house heating installations in 1949, as compared with 450,000 in 1948, in spite of the extension of natural gas service; this will mean immediate sales of large quantities of heating oil as consumers' tanks are not yet filled.

The oil industry's plans for selling large quantities of diesel oil to American railroads may fall short, as a result of successful road trials of the American Locomotive Co.-General Electric Co.'s new gas turbine-electric locomotive (the Chinook), which burns Bunker C fuel oil with a power plant less than one-half as heavy as a diesel locomotive.

The world-wide dollar shortage has already lost some markets for American oil to British oil interests and, because of the devaluation of the pound, the British may be able further to undersell American oil in competitive world markets.

high pressure operations

CHEMICAL ENGINEERING, in its August 1949 issue, devoted considerable space to a symposium on high-pressure operations and equipment. It was stated, by way of definition, that low pressure ends and high pressure begins at 750 psig.

Two trends were stated as being particularly noticeable: (1) The growth in the number of high-pressure chemical processing applications and the use of even higher pressures, and (2) the improvement in high pressure engineering and know-how. The last war proved a great stimulus to commercial operation at high pressure, and developed processes for making ammonia and nitric acid at 1000 psi, and polyethylene at *2000 atmospheres* (the latter still being the highest pressure in practical use). Ethanol is made at 1000 psig, and hydrogenation in oil refineries is carried out at 3000 to 5000 psig. Many future processes will use pressures of this level and higher, and duPont is doing research on 100,000 psig.

There are five general types of construction used for pressure vessels:

1. Solid wall produced by forging or boring solid rod.
2. Bent sheet with single longitudinal weld.
3. Several layers, formed by shrinking successive cylinders on each other or welding successive cylinders over each other with staggered welds.
4. Wire winding around a central cylinder.
5. Interlocking metal tape wound around a central cylinder.

Most engineers agree that the applicability of the above designs is as follows:

Welded vessels below 4000 psig.

Layer vessels for 5000 to 6000 psig.

Forged vessels above 7000 psig (layer above 100 tons weight).

Strap wound (not well known . . . developed in Germany) may compete above 5000 psig.

Concurrently there are developments and improvements in specific designs such as reactors, separators and heat exchangers; in compressors; in piping, flanges and gaskets; in valves; and in instrumentation, for such purposes as measurement and control, and liquid level indication.

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Available with Plain Flat Head or with Lock Wing and tested for 125 pounds pressure. Galvanized or Black finish.

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The Plain Flat Head
Iron Body
Bronze Key
Gas Stop
Sizes
¾" 1" 1¼"

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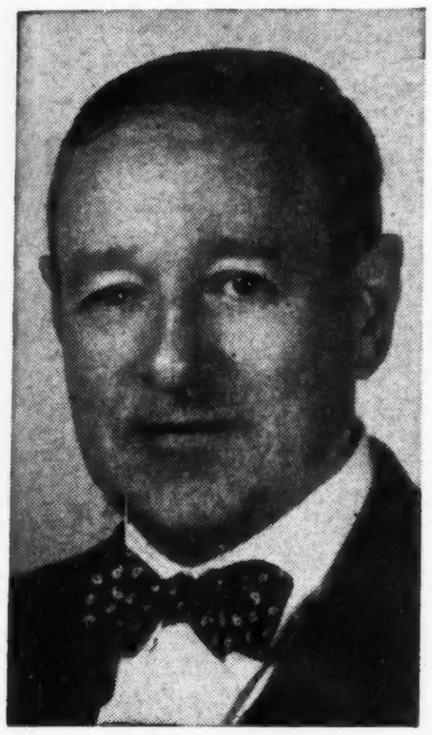
PROMOTIONAL NOTES AND NOTIONS

by Stanley Jenks

promotional leadership



THE GREATEST HONOR we can pay any man in the gas industry is electing him president of the American Gas Assn. It is our finest tribute in the realm of gasdom.

Our new president, Hugh H. Cuthrell, vice president, Brooklyn Union Gas Co., has richly earned the honor by his unstinted personal effort in association affairs, especially in the sales promotional field. *Hugh H. Cuthrell is Mr. Gas Salesman himself.* His participation in association promotional activities has been a "must" for many years, because, under his personal leadership, his own company has practiced very effectively what he has preached, and proved his ideas both practicable and profitable.

There is no need to dwell on the pressing need for "hoss-sense" salesmanship under today's conditions. The battle of the fuels has been joined since appliance surpluses arose.

Therefore, the election of Hugh H. Cuthrell to the AGA presidency is timely and a happy omen, if you please, of an industry geared to sell its way upwards and onwards.

pride and prejudice

"CAN THE CP RANGE BE IMPROVED?" is one way of asking whether any particular CP specification is as satisfactory as it could be.

One of the most controversial features is the automatic lighting system of all burners. The present gas pilot system works well, but it involves the continuous burning of a pilot flame without any contribution to the thermal efficiency of the CP range. Furthermore, from a manufacturer's viewpoint, it is an expensive way to achieve a certain result. Why not either a catalytic or an electric pilot?

The catalytic principle of ignition is nothing new in the gas industry. In Great Britain, better than 20 years ago, I saw radiant type fires and illuminating fixtures ignited with a catalyst by merely turing the gas valve. While appreciating that the problem is not so simple as all that, I believe there ought to be a practical solution within the ramifications of our own extensive research facilities.

And why not an electric pilot, pray? Is the opposition to it simply one of pride and prejudice, or are there good, sound economic and practical reasons why it is unacceptable?

Most of the discussion against it heard in this corner has been sheer, unadulterated prejudice, based on a reluctance to concede that there can be anything meritorious about electric utility service. Which is nonsense, of course.

texan technique

IN THE OLD DAYS, when I was peddling automatic gas water heaters and boilers, Texas was even then recognized as a happy hunting ground for gas appliance manufacturers. It still is, judging by the advertisements of plumbing supply distributors in a monthly publication issued by the Associated Plumbing Contractors of Texas Inc.

Just for the heck of it, I checked a recent issue and measured 248½ column inches of gas appliance advertising out of a total of 625 column inches of display advertising in the publication.

When you consider the thousands of items—soil pipe, valves, fixtures, etc.—handled by a plumbing supply jobber, it is remarkable that he used approximately 40% of his display advertising in his customers' own organization publication for gas appliance advertising—mostly automatic gas water heaters.

It is very obvious that the Texan plumbing contractors find the gas appliance business profitable—a most important plank in our greater gasification program.

travelogue

RECENTLY I MET a young fellow, who seems to have quite a future on the East Coast. He was celebrating his first anniversary in the Atlantic Coast territory. I refer to Theodore Therm, who, in an advertisement published by Texas Eastern Transmission Corp. in the *Philadelphia Inquirer*, was describing his eventful journey from Texas to Philadelphia via the Little Big Inch and Big Inch pipelines.

Theodore Therm tells a very interesting story of his experiences from the 2-mile deep gas well in Texas through the natural gas processing plant; compressor stations; scrubbing plant; under the Mississippi river and countless other smaller rivers and creeks, railroad lines, and highways; and finally over the Alleghenies into Philadelphia, where he and millions more Theodore Therms were used to enrich manufactured gas.

The journey took 2½ days.

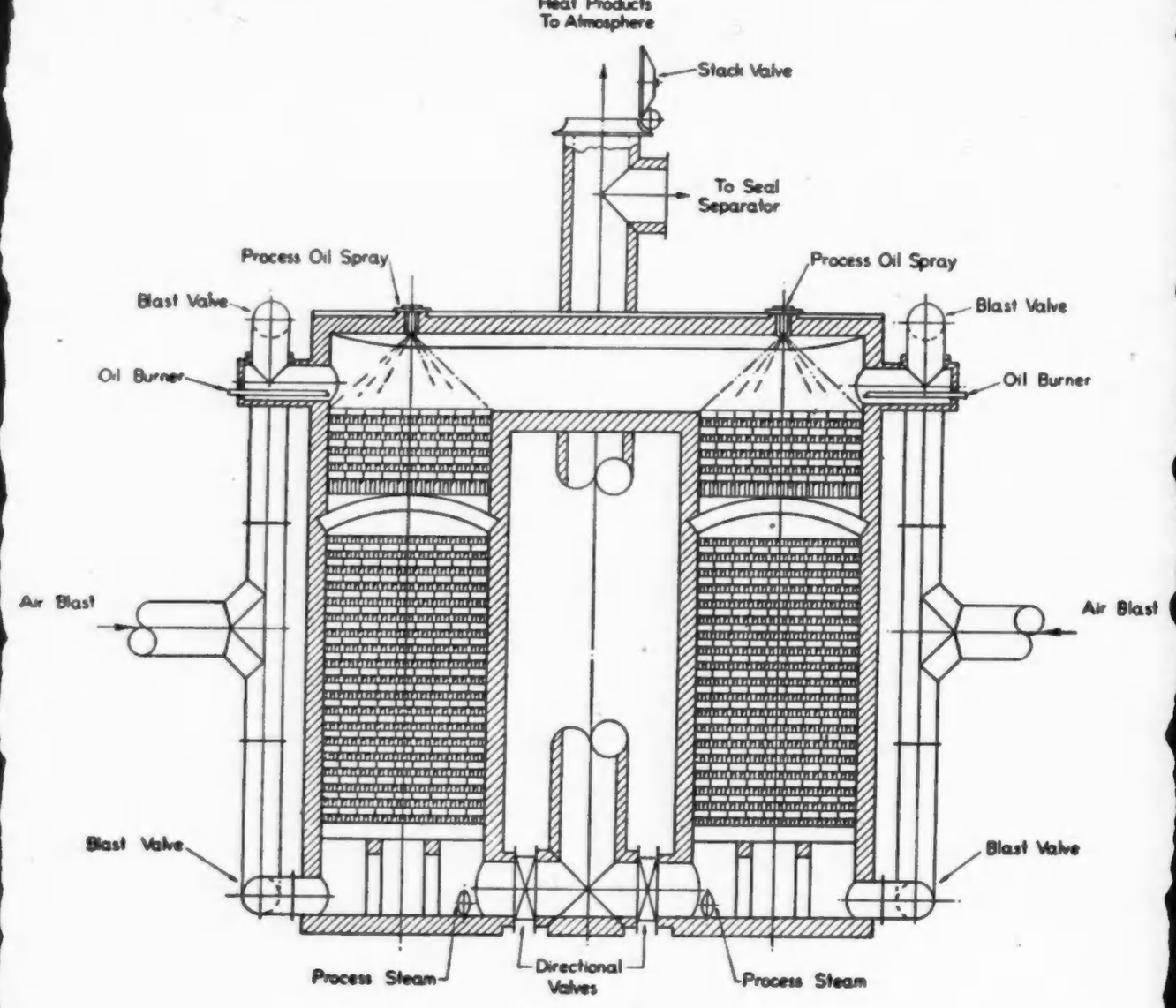
lest they forget

NOW IS A GOOD TIME to start reminding people that they get good gas service because fellow Americans have invested their savings to provide the facilities and that reasonable profits are essential to attract further savings to finance expansion for better service.

The Consolidated Edison System puts it this way.

> "CON EDISON HAS MORE THAN 30,000 EMPLOYEES. But for every employee there are five stockholders . . . a total of 154,000. Only by paying reasonable dividends can Con Edison keep attracting stockholders' money to buy the modern equipment required to produce more low-cost electricity and gas . . . That's why adequate electric and gas rates are good business for everyone—consumer, employee, and investor."

The Latest in Oil Gas Generation



TWO SHELL REGENERATIVE OIL-GAS SET
Universal Operation - Light Or Heavy Oils
Patent Pending

Again

1. Designed expressly for high efficiency Bunker C Oil operation.
2. Can operate with any grade of gas-making oil with increased efficiency.
3. Lowest investment cost per therm of daily generating capacity.
4. Produces manufactured gas in the holder at lowest cost per therm.
5. Low manpower requirements for operation and maintenance. Eliminates handling of solid fuel, ash and clinker.
6. Quickly started — dependable 24-hour operation.

The Gas Machinery Company has a background of over 25 years' experience with oil gas generating equipment, including the well-known HI-BTU Processes.

Recent A. G. A. Research — sponsored by Edwin L. Hall — has resulted in published data, establishing the practicality of using high-carbon oils by application of regenerative principles.

New GASMACO oil gas equipment is fully regenerative. It operates on a new, streamlined cycle. Installations are currently under construction. Why not investigate the possibilities in your using low-cost oil NOW?

Send for Bulletin A-203 and other information . . . or call in the GASMACO Engineer to discuss your requirements.

THE GAS MACHINERY COMPANY

16108 WATERLOO ROAD
CLEVELAND 10, OHIO

Designers • Fabricators • Erectors
Gas Plant Equipment and Industrial Furnaces

Exclusive

LOW COST MANUFACTURED GAS

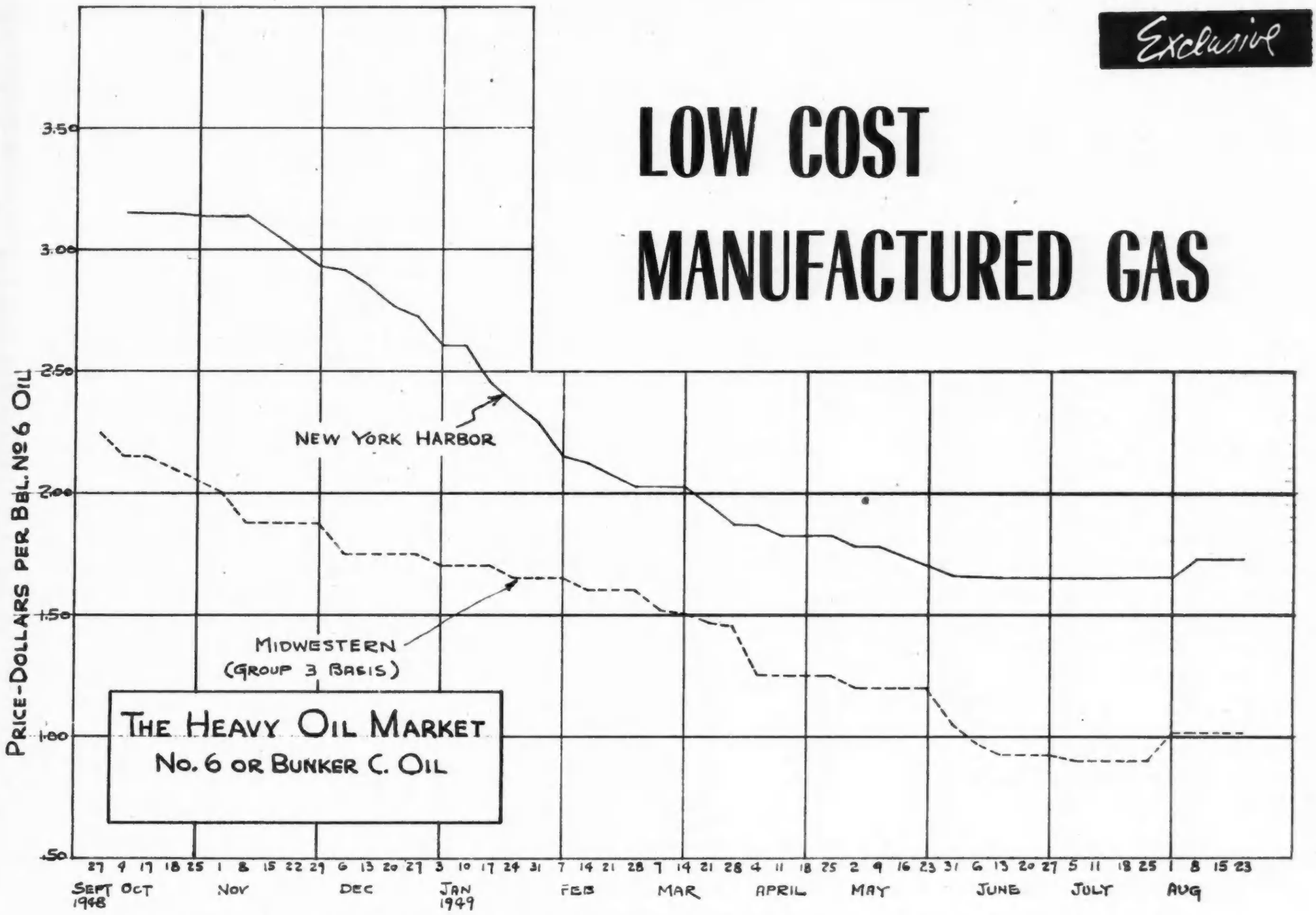


Fig. 1. Compiled from prices published in *National Petroleum News*. Where a spread in posted prices occurred, average price was used.

By ROBERT KYLE

THE SUDDEN AND SHARP dip in the price of oil from a postwar high of a year ago is having a profound effect upon gasmen's thinking in more than one respect. In natural gas territories with heavy interruptible industrial loads it's bringing gray hairs to many a head. In oil-gas areas it's bringing smiles to utility men and customers alike, as escalator prices reverse their trend.

On middle ground is the man considering a conversion fom one type of gas to another — particularly from a manufactured process to natural gas. Is such a step wise, considering the economic possibilities of modifying present equipment or of installing new equipment to turn out 1000-Btu oil gas?

The author, sales engineer for The Gas Machinery Co., Cleveland, draws no final conclusions, but points out that in the light of changing economies, considerable study of the relative advantages of each fuel is in order. Just one interesting concept which he proposes is the "50% peak load," with 100% natural gas load factor.

Mr. Kyle bases his arguments on two premises, which future developments in price relationships, techniques, and other factors may materially alter: (1) that the present price of fuel oils is what might be termed "normal" as compared with last year's highs, and that it will not materially rise again, and (2) that natural gas, which he says "has been experiencing a gradual but steady increase in production cost and . . . transmission charges" will not experience a similar cost decline.

NO study of the economics of gas making would be complete without consideration of the fuels involved—their cost and availability. Particularly has this been true during recent years when fuel costs have had such a far-reaching effect on gas company profits (and losses!)

One of the important other factors which has caused increasing concern is labor cost, and this is directly related to the nature of the fuels employed.

During the war years and immediately afterward gas-making oils were scarce and high priced. Yet to those who were closely studying the market in its various ramifications, it was apparent that something was about to happen and especially to residual oils. What happened is shown on the oil market graph *(Fig. 1)*.

It is interesting to note that in less than a year, the average price of heavy oil at New York Harbor declined from $3.15 per barrel to $1.66, a drop of 47.5%. During the same period midwestern oil declined from $2.25 to 90 cents average, a drop of 60%! The posted price of Group 3 residual has been as low as 60 cents per barrel; the graphs reflect average prices. Spot quotations in both general areas have frequently been under the lowest posted price.

The decline in oil prices has already lowered the cost of carburetted water gas to some extent. But solid fuel and labor costs have not shown a corresponding decrease. Think then of the effect upon gas manufacturing cost when straight oil gas is produced—and the oil represents almost all of the cost of making gas!

Crude oil production has been cut back in an effort to control stocks and stabilize the market. This apparently has been effective, yet the producers and refiners will eventually have to shift back to high gear. They must do so because of the demand for gasoline, diesel fuel and light oil products. With the efforts to meet this demand must come the residual fuels, averaging nationally 20-23% of the crude oil processed. Theoretically this percent-

age can be reduced, but practically the reduction must be small and over a long term.

The net result will be low priced heavy oil, readily available, with comparatively high cost light virgin gas oil.

Some of the cutback in crude production has been low gravity, low grade crude oils. The gas industry should not lose sight of these in the future. Comparatively undesirable to the oil refinery, the heavy crudes might become good gas-making oils.

Another factor to be kept in mind is the increasing availability of foreign oils.

Gas men are now in a position to take advantage of the oil situation. One hundred percent Bunker oil in carburetted water gas has already been worked out, but this calls also for low-cost solid fuel. Improved water gas methods are available, and effective, depending on the area fuels supply. However, with low-cost heavy oil on our doorstep, the really remarkable low-cost gas is oil gas. Thanks to the foresight and ingenuity of members of the industry and to the AGA research program, the processes and equipment are now ready for manufacture of gas from heavy oil.

When the AGA committee under the PAR program undertook the investigation, a gas production research program with special consideration given to high-Btu oil gas was recommended. This suggestion was not only because of the lower manufacturing costs to be obtained but also because of the large gain in thermal capacity with comparatively little expenditure for scarce materials.

A number of oil gas installations were in existence. In 1933 The Gas Machinery Co. began altering modifying water gas sets to produce a straight high-Btu oil gas. This method supplanted the earlier attempts to make high-Btu water gas, but still left something to be desired in the way of clean continuous operation. It was still a dual fuel process, requiring coke handling and fire cleaning. The Gas Machinery Co. later developed a 100% oil method invented by Hugh M. Blain of the Public Service Co., New Orleans. This process was quite successful and forms the basis for now current developments. In all, over a hundred installations of straight oil gas have been made in this country and several in Canada. This is exclusive of the Pacific coast operators who use a some what different method.

The current low cost and increasing availability of heavy, high-carbon oils have encouraged Cambridge (Mass.) Gas Light Co. to make extensive additions to its oil gas generating plant. In 1947 the company remodeled its carburetted water gas sets, by contract with The Gas Machinery Co., to make 951-Btu oil gas. One of these sets was to be further rebuilt and another of new design was to be erected under the program.

A two-shell design, the new set will be similar to the one described in this article, as illustrated in Fig. 3.

Oil Gas Research

Under sponsorship of the promotion, advertising and research committee of the American Gas Assn., the gas production research committee in 1947 initiated a research project whose objective was study of the economical production of high-Btu oil gas from heavy, low-cost, high-carbon oils.

Derived from fundamental principles, a regenerative cycle was proposed which was expected to maintain relatively low temperatures in the outlet of the superheaters and relatively high temperatures in the generators.

After further study, the proposal for full plant scale tests was accepted by the committee. The Spring Garden station of the Consolidated Gas Electric Light & Power Co. of Baltimore was selected as a suitable location, the Baltimore operators being interested in high-Btu gas and having plant equipment which could be diverted and adapted for test.

That the AGA-sponsored tests were successful has been well publicized and can best be reviewed by referring to the report of the gas production research committee's Research Bulletin Project HB-1, "Hall High-Btu Oil Gas Process."

Another phase of the investigation included operation of a twin generator high-Btu oil gas set constructed in the same fashion as those in use by other utilities.

Light Oil Best

The twin generator set was first operated with light oil and various heavy oils were tried up to 6% Conradson carbon. Results were entirely satisfactory with the light oil, as was to be expected. It was found possible to operate with the heavier oils containing carbon up to 6%, but special operating technique was required, involving cycle changes and time out for scurfing.

Except as a possible emergency measure, the indication is that this type of high-Btu set, being designed for light oil, should not be operated with heavy oil unless modified for this purpose. Emergencies can occur, however, as was the case with similar equipment previously at Nyack, N. Y. There necessity forced use of heavier oils during periods when light oil was unavailable.

The regenerative type of construction can be carried out by remodeling existing water gas sets, e.g., by adding a fourth shell of superheater size to an existing three-shell set. The four-shell arrangement could also, of course, be accomplished with entirely new construction. New construction, however, is not limited to four shells nor to the physical features existing at Baltimore. The operating principles demonstrated, including the important feature of regeneration, can be accomplished in

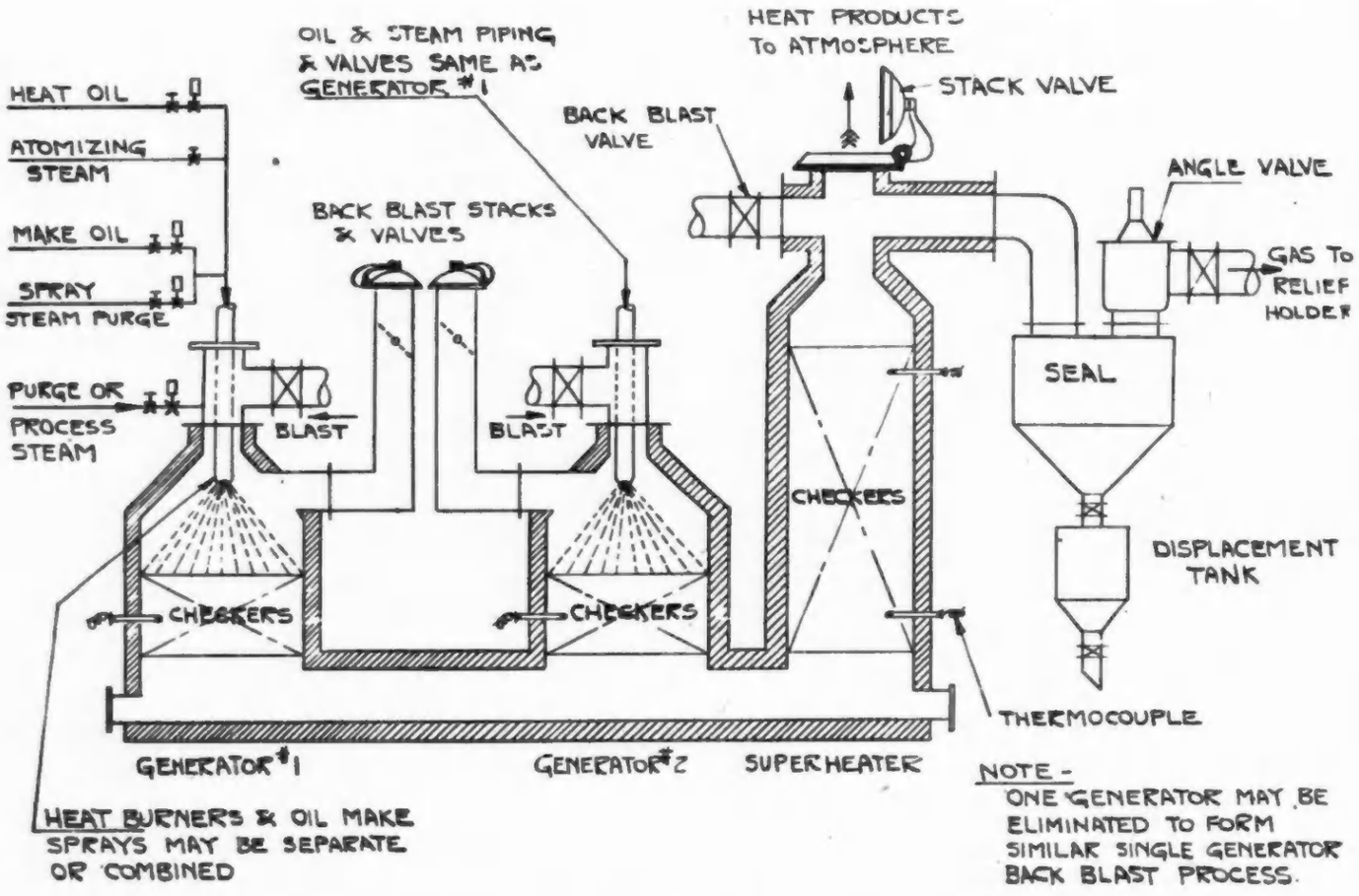


Fig. 2. Twin generator back blast oil-gas process for operation with heavy, high carbon oils.

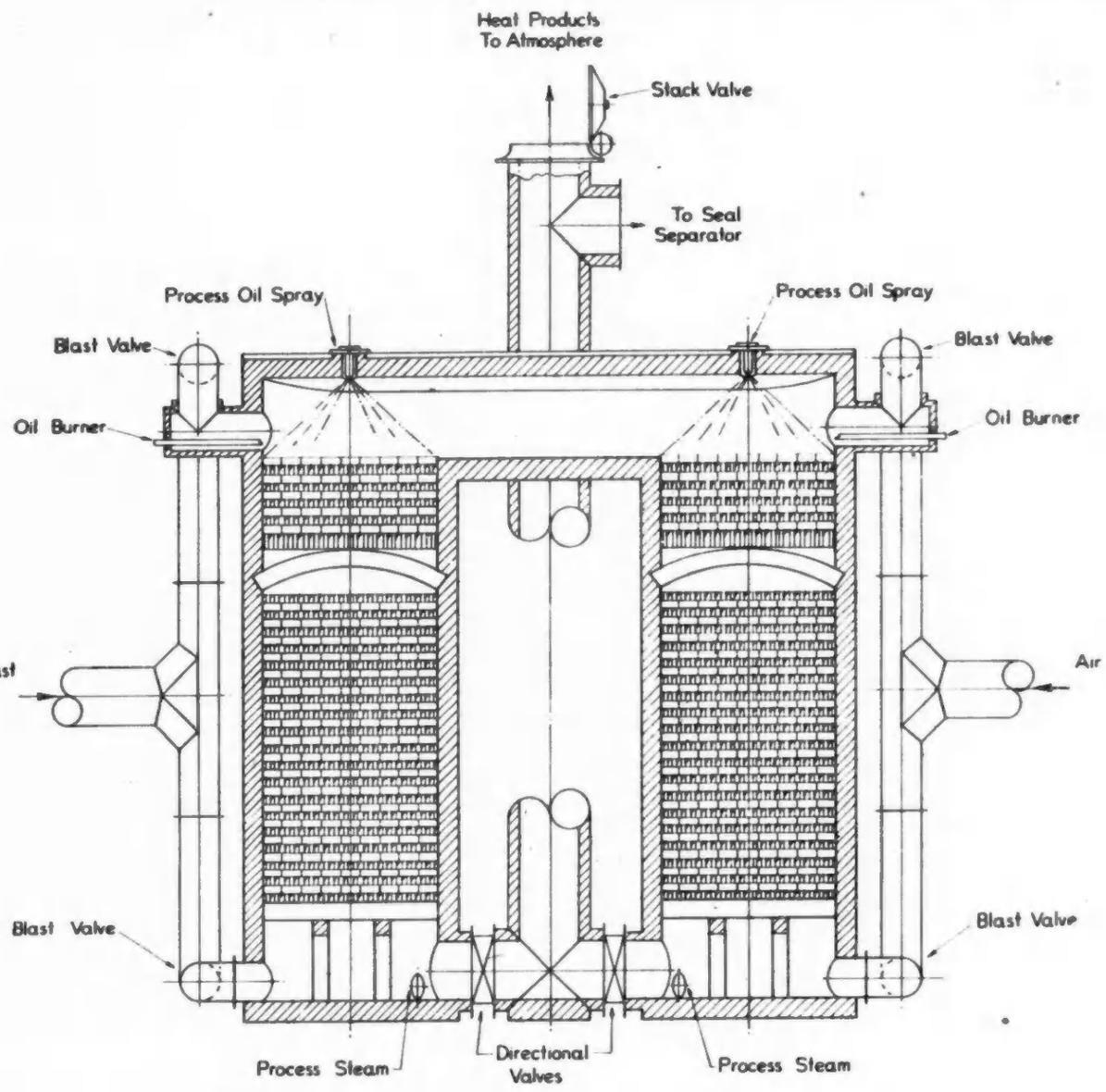


Fig. 3. Two shell regenerative oil-gas set. Universal operation — light or heavy oils.

various ways. Certain manufacturers of gas plant equipment have now been issued a royalty-free construction license under the Hall process of the AGA.

Adapting To Heavy Oil

Existing high-Btu oil gas sets of either twin generator or single generator design can be modified with regenerative features to accomplish the purpose of utilizing heavy oil. The same construction, of course, could be applied to water gas sets and a number of variations are possible. The Gas Machinery Co. has designs available for this purpose (e.g., *Fig. 2*).

From the standpoint of new installations, the best performance can be obtained from a novel two-shell design which is described below (See *Fig. 3*). This offers the best performance—most output per dollar invested and highest operating efficiency.

Several installations are now under way in which water gas sets are being remodeled as shown diagrammatically in *Fig. 2*.

The basic process of making straight oil-gas in this way has already been described in literature which has come into prominence during the past three years. The present modification is addition of back blasting which burns off carbon left by the heavy high-carbon oil. The heat liberated in burning off the carbon deposit is returned to the generating sections of the apparatus available for oil cracking during the subsequent run.

Two of the current installations are employing one generator in combination with the superheater, with single back blast. Another utilizes the twin generator arrangement as indicated in *Fig. 2*. This type of reconstruction is suitable to any size set, but the present installations happen to be comparatively small.

Converting Generators

The arrangements described above are comparatively inexpensive, but do not offer quite the efficiency obtainable with new designs and new construction.

The water gas generator of a three-shell set may be in disrepair, in which case the generator can easily be disconnected and the carburetor converted to an oil gas generator, utilizing the superheater and adding back blast. If the generator is in good condition but capacity is not critical, the generator can then be converted into a small regenerator, thereby adding somewhat to the operating efficiency.

Two two-shell gas sets and one four-shell set are now under construction by The Gas Machinery Co. The two-shell set is of a new design illustrated by *Fig. 3*. Since this apparatus contains many new featurees, a description of its construction and operation should be of interest.

The set is made in the form of a large inverted "U." The two sides are identical and in general the operation is double and reversible. It is possible, however, to employ a single riser pipe and stack, connecting to the shells by directional hot valves.

Checkerbrick Zone

Each shell has a generating zone of checkerbrick supported by an intermediate arch and superheating section supported by bottom arch. A substantial portion of the checkerbrick is silicon carbide.

At the bottom of the shells are air blast and steam connections and gas (or blast) outlets. At the top of each shell is an oil burner, air blast, process oil spray and connecting tunnel. The drawing of *Fig. 3* has been reduced considerably in the reproduction; actually the volumes are quite large. The top connecting tunnel, for example, measures the full width of the shells and affords ample combustion space eliminating a restriction common to previous oil gas sets.

A number of operating cycles are possible—with variations. A typical sequence includes the first step of blasting with air admitted to the bottom of Shell No. 1 and to the oil burner at the top of this shell. The products of combustion pass through the tunnel, down Shell No. 2 and out the stack. During this process, the carbon deposited from the previous run is burned off and the heat recovered. Following the blast, steam is admitted to the bottom of Shell No. 1, then process oil, a portion at each spray. Oil gas is generated and leaves at the bottom of Shell No. 2, through the directional valve and riser pipe to the wash box. Following this make period, a short steam purge is made; then blasting occurs in the opposite direction: that is from Shell No. 2 to Shell No. 1. Subsequently a make run is also made in this direction and oil gas leaves the bottom of Shell No. 1 through the directional hot valve and enters wash box. The cycle is thus completed.

The operations described above may seem complicated; yet the set operates easily from an automatic time cycle and thermal control. Both hydraulic and mechanical interlocks are employed, with automatic safety shutdown.

The temperature at the top of the shell may be 1800° F, at the bottom 1200° F. In this way the high temperature required for oil gas formation is maintained but the heat is kept in the set by the regenerative operation. Only a minimum of heat is permitted to escape. This makes for high efficiency and, incidentally, establishes conditions

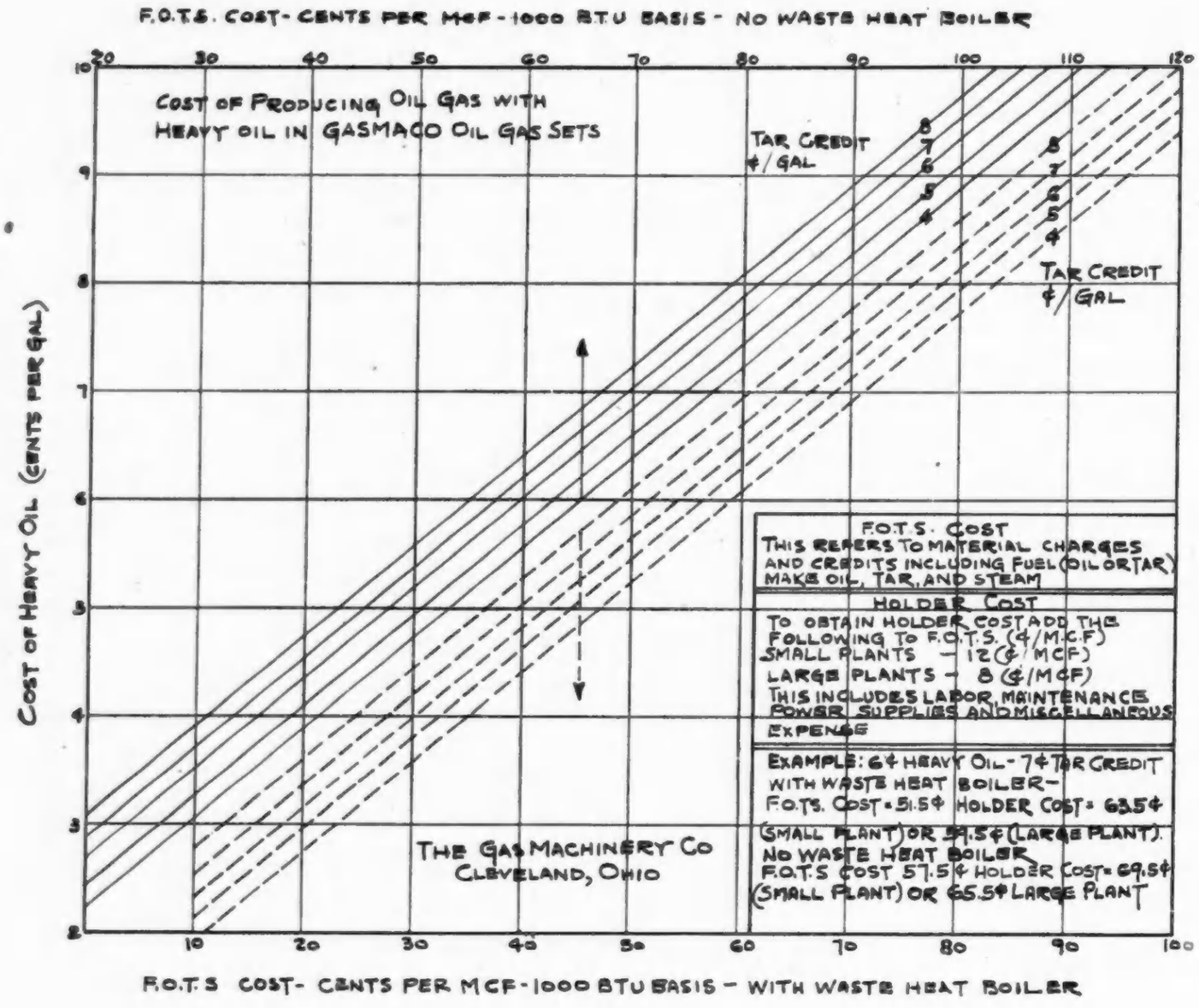

F.O.T.S. COST - CENTS PER MCF - 1000 BTU BASIS - NO WASTE HEAT BOILER
COST OF PRODUCING OIL GAS WITH HEAVY OIL IN GASMACO OIL GAS SETS
TAR CREDIT ¢/GAL
TAR CREDIT ¢/GAL
COST OF HEAVY OIL (CENTS PER GAL)
F.O.T.S. COST
THIS REFERS TO MATERIAL CHARGES AND CREDITS INCLUDING FUEL (OIL OR TAR) MAKE OIL, TAR, AND STEAM
HOLDER COST
TO OBTAIN HOLDER COST ADD THE FOLLOWING TO F.O.T.S. (¢/M.C.F.)
SMALL PLANTS - 12 (¢/MCF)
LARGE PLANTS - 8 (¢/MCF)
THIS INCLUDES LABOR, MAINTENANCE, POWER, SUPPLIES AND MISCELLANEOUS EXPENSE
EXAMPLE: 6¢ HEAVY OIL - 7¢ TAR CREDIT WITH WASTE HEAT BOILER - F.O.T.S. COST = 51.5¢ HOLDER COST = 63.5¢ (SMALL PLANT) OR 59.5¢ (LARGE PLANT).
NO WASTE HEAT BOILER F.O.T.S COST 57.5¢ HOLDER COST = 69.5¢ (SMALL PLANT) OR 65.5¢ LARGE PLANT
THE GAS MACHINERY CO CLEVELAND, OHIO
F.O.T.S COST - CENTS PER MCF - 1000 BTU BASIS - WITH WASTE HEAT BOILER

Fig. 4. Cost of producing oil gas with heavy oil in Gasmaco oil gas sets.

favorable to oil gas formation and fixing.

Further economy can be obtained by operating a waste heat boiler during the blast period, which is about 50% of the cycle. This will definitely pay for itself in a base load plant. Since the process steam requirement is low, a steam credit should actually result.

Temperature Difference

In one respect, particular note should be made of the difference in temperature between top and bottom of the shells. In this case the convection currents setup, or "chimney effect," will be considerable in spite of the fact that the air blast and make gas have pressure sources. With a 600° F. differential, these convection currents will be in the magnitude of 50 ft per second. This is higher than generally appreciated and likely exceeds the normal blast and make gas rates through the set.

The effect of convection, of course, is for hot gases to tend to move upward. A gas to be heated should pass upwardly through checkerwork since heated gases continue ahead while cold gases remain behind to absorb heat. This is what happens when regenerative air passes up through Shell No. 1 of *Fig. 3*, for example.

In giving up heat, gas should pass downward through checkerwork. The cooled gases then continue on, while the hot gases linger to give up their heat to the checkerwork. This is what happens during the heating up of Shell No. 2 following the preheat in Shell No. 1 and combustion in the tunnel.

During the make period it is not just a case of heat transfer, because endothermic chemical reactions are also taking place. Steam is coming upward through Shell No. 1, for example, which is the right direction for preheat. Oil particles and vapors are being picked up counterflow at the top of the shell and any turbulence is advantageous.

The highly endothermic reactions taking place in the decomposition of oil hydrocarbons require that motion should be downward in order to complete the reactions and dispatch the cracked products most effectively. This is the type of flow incorporated into the design of *Fig. 2*. It has been possible, therefore, to obtain optimum flow conditions for both the blast and make periods.

Practical Musts

No amount of research work, no reams of data will be of value to the utility operator and utility management unless translated into tangible down-to-earth practical working equipment. The apparatus must be sturdily constructed; it must be operable. It should be readily understood by the operators. Of primary importance, however, the apparatus and process should use feeds and fuels which are obtainable, easily handled, and of low cost. The gas produced must be well-fixed and have good burning characteristics. If there are by-products and handling equipment, the by-products can be turned to advantage in conserving fuel or reducing overall costs.

Here are the materials involved in producing 1 Mcf of approximately 1000-Btu gas, using 6% carbon oil:

Heat oil	1.0 gal
Process oil	11.0 gal
Steam	15 lb
Air for blast	3600 cf
Tar produced	2.3 gal
Light oil recovered	0.3 gal

With the above data and a knowledge of local fuel prices, the cost of manufacturing oil gas can be computed. In order to facilitate such calculations, the chart of *Fig. 4* has been prepared. This graph makes possible a quick calculation of oil gas cost and also enables the user quickly to compare various fuel prices, operation with and without waste heat boiler, and other conditions.

In determining holder cost, the usual charges for miscellaneous works expense, labor and supervision are added but costs of clinker gangs and solid fuel handling are eliminated. Maintenance costs are low.

A set such as shown on *Fig. 3* can be built for about $25 per Mcf of daily capacity, making 1000-Btu gas with 6% carbon oil. Normal capital costs for interest, taxes and depreciation would be 12-13%. With 300 days base load operation per year for the set in question, total carrying charges would be only about one cent per Mcf.

It should be pointed out that costs discussed above are based on a heating value of 1000 Btu in the gas produced. On an equivalent 530-Btu basis, for example, the cost of gas would be 53% of the amount indicated by *Fig. 4*.

Heating Value Range

The process is not limited to production of gas of about 1000 Btu. A range in heating value of 600-1200 Btu is readily obtainable, if desired. This is accomplished by changes in the operating cycle and temperatures, including use of blow run. It is also possible to blend oil gas with other plant gases with diluent gases or with air, as local conditions warrant.

A study of *Fig. 4* will show that oil gas in some situations can be made for five cents or less per therm. This closely approches the cost of natural gas in certain areas.

This apparent phenomenon is due to the radical drop in heavy oil prices, coupled with introduction of a suitable process. Natural gas, on the other hand has been experiencing a gradual but steady increase in production cost and increased transmission charges because of high construction costs and longer and longer lines.

The writer does not mean to imply that natural gas is not still a desirable

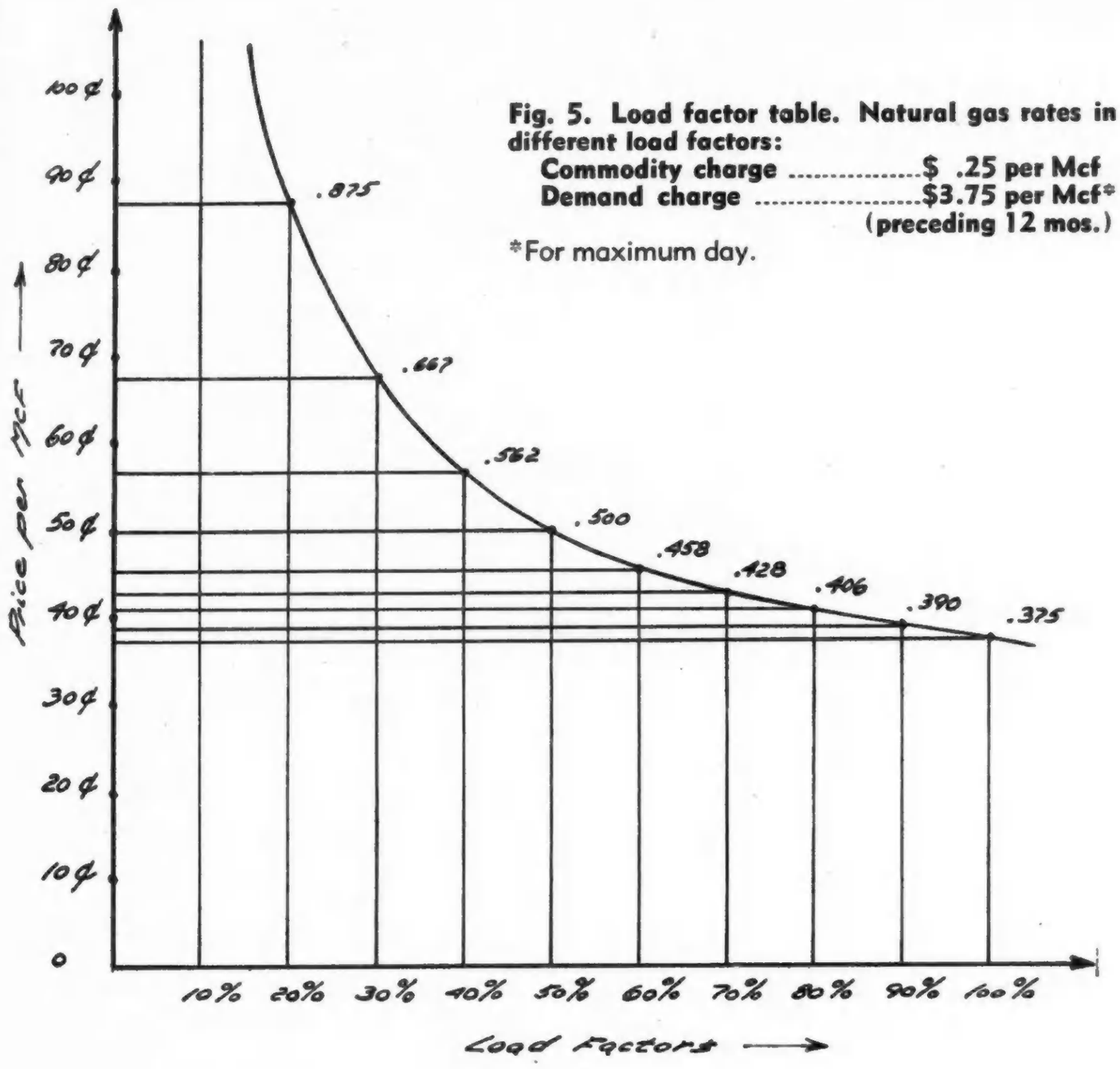


Fig. 5. Load factor table. Natural gas rates in different load factors:

Commodity charge .....$ .25 per Mcf
Demand charge .....$3.75 per Mcf*
(preceding 12 mos.)

*For maximum day.

fuel in many cases. The present situation, however, does change the nature of one's thinking. The principle of peak shaving, for example, should not be limited to occasional peak days but might be 50% of the load. The available natural gas can best be purchased on a 100% load factor basis or the equivalent in a two or three part rate. The relationship of load factor to the average cost of natural gas is shown on *Fig. 5* for a hypothetical natural gas rate basis. The advantage of a high degree of peak shaving is obvious.

1. The economical production of oil gas from heavy oil has already been demonstrated.

2. Equipment is available to carry out these processes. Installations are now in progress, and are about to be placed in operation as of this writing.

3. Heavy oil can be purchased at low cost. The market situation indicates low prices for heavy oil in the future with comparatively high cost for light gas oil.

4. Data are given with regard to equipment cost, operating principles and gas manufacturing costs.

5. Natural gas expansion should be considered in the light of constant natural gas flow rates augmented by extensive low cost peak shaving.

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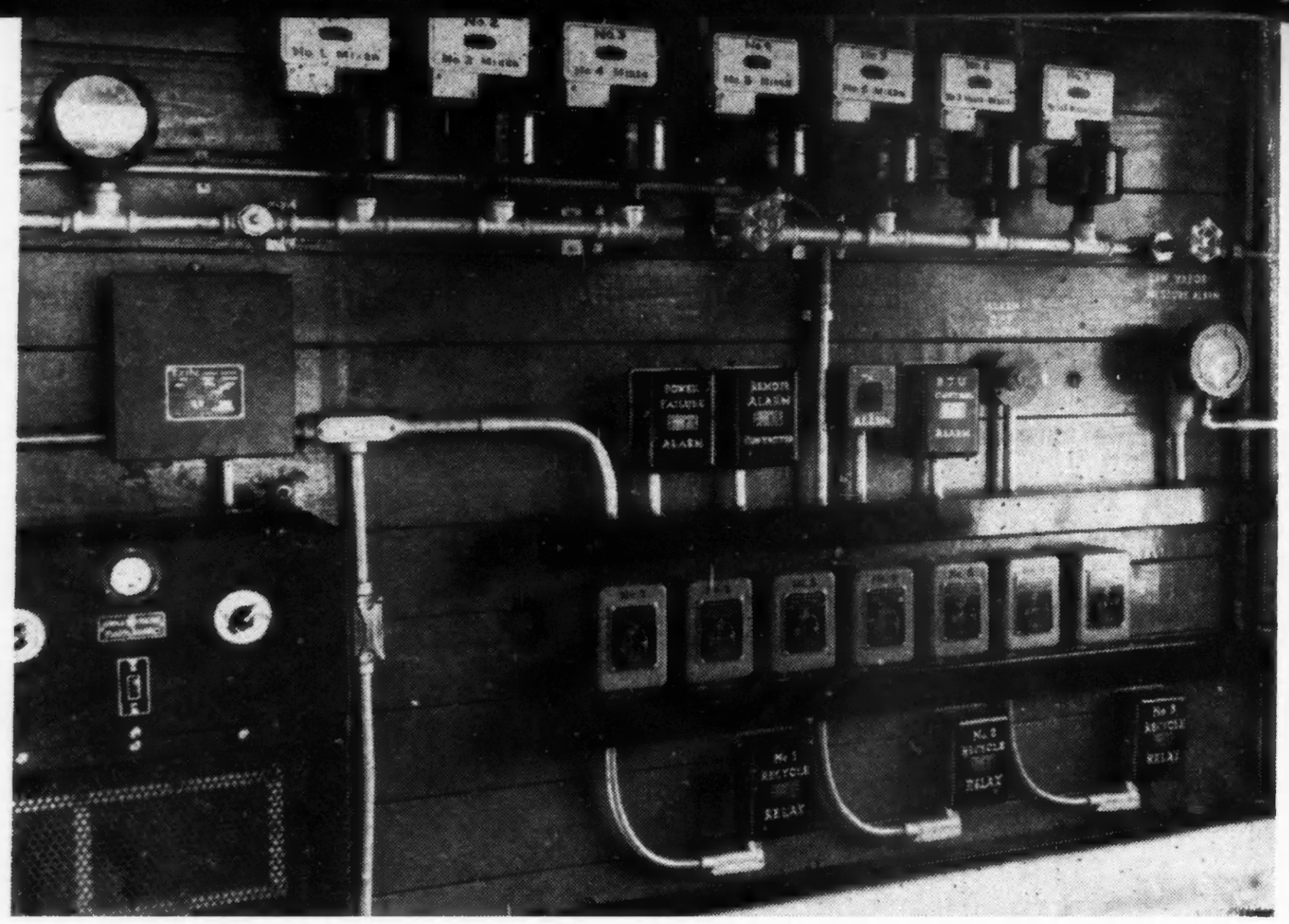


Electrical control room of Peacock-designed propane-air and gas mixing plant.

Battery-Controlled, Holderless Propane-Air System Operates for New York Utility

By PAUL E. PEACOCK JR.

The author has recently applied for patents covering the propane-air and gas mixing and control system designed by him. H. Emerson Thomas & Associates Inc. (Westfield, N. J.) have exclusive rights to the patents . . . Mr. Peacock is a vice president of that LP-Gas system consulting firm. The patents cover a propane-air gas plant which operates into distribution systems and is independent of constant supply by utility electricity. An automatic plant of the type is now in operation for the New York Power & Light Corp., Hudson, N.Y.

I started in 1945 working with venturi type gas-air mixers and have made up designs for several improvements which have gone into the manufacture of one make. These early uses were for operation into a holder with automatic holder operation devices.

Exclusive

In late 1945 I began working on the idea of an automatic LP-gas-air plant for operation directly into the distribution system without benefit of a holder or other storage arrangements.

In the process of selecting controls, I received data on numerous air pressure control devices, most of which I eliminated because they required an air compressor which was dependent upon utility electric supply which might fail. Some of the units could use the propane pressure for control, but here the gas bleed-off of 15 cfh or more created a hazard as well as an expense —the cost of the gas which could not be used normally.

After nearly a year in research (or I should say search) I came up with the same idea I had used for the holder-operated units—the electric solenoid valve. These valves do give snap action and are rather dependable. Here again I had the problem of electric supply failure; to circumvent this I first worked on a combination of utility electric supply for use during normal conditions and having an automatic throw-over during power failures to operate the mixers from battery supply.

After several conferences with telephone company engineers regarding the type of battery, life expectancy, and other considerations, I changed my thoughts, at the advice of the telephone company engineers, from the combination system to a straight battery control system. The reason for the change was that, as the telephone engineers pointed out, if a piece of equipment such as batteries was held only for emergency use it was liable to fall into disrepair because of neglect and, when needed, it would be in bad order. I therefore started on the idea of using the battery system only.

From here I went to the engineers of one of the largest battery manufacturers and they in turn worked with me to recommend the best type of battery for the service, which, incidentally, is the battery normally used by telephone company operations. Normal life expectancy would be about 14 years.

For constant maintenence of the batteries at top efficiency we worked out a combination trickle charge and hourly automatic charge, the latter bringing the batteries up to full charge once each hour. Once a month the trickle charge is given manually for an hour or so to even out any charge variations that may show up from battery cell to battery cell.

Incidentally, the battery system is sized to give a minimum of 24 hours operation at peak load condition without recharge. Thus, there can be a power supply failure of 24 hours before any trouble might result. Since the plant does not operate at peak for 24 hours straight, it is quite likely the batteries would last several days without recharge. In event of a prolonged power failure we recommend that one of the smaller units be turned on manually (by bypassing the solenoid) and left on while the remainder of the gas demand would be met by the other automatic mixers. By this operation the battery system would perhaps last for a week or longer. It is unlikely that a power failure would be for a longer period than that. If there should be, then the plant would be operated manually until power was restored.

The plant's alarm system also uses the battery electric supply. Consisting of a horn or bell, it is connected through leased telephone lines to any point desired, such as the manager's

home or superintendent's home, and to the gas office. The alarm is connected with proper control so as to sound in case of power failure to the charger, whether from actual supply failure or from a transformer or fuse blowing at the plant. The alarm is also connected with high- and low-Btu contacts in the Thermeter Btu recorder described. Pressure alarms are incorporated for high or low distribution pressure; and for low pressure on the vapor supply to the mixers. In other words, the plant is amply protected from about every angle by suitable alarms in case any phase fails to operate as designed.

We now come up to the mixing equipment, which we design for every job on a 'tailored-for-the-job' basis. Usually we use five mixers of different capacities, with the smallest one designed for the minimum load period and the largest for the peak load period. The intermediate mixers operate to handle the 'in-between' load conditions. For sake of illustration, let us assume that we installed five mixers having the following capacities: 5 Mcfh; 10 Mcfh; 15 Mcfh; 20 Mcfh; and 25 Mcfh. This would be for a plant having a normal peak of 25 Mcfh.

In the size of the mixers we try to estimate the capacity or demand close enough to install as the smallest unit one which would just meet the lowest night load. Sometimes this is hard to do, in which case the smaller mixer would take care of the smallest load by an "on-off" operation. Also, in the large mixer we install a mixer which should meet the highest peak load by itself without assistance of the other mixers. Should some unusual condition develop such that a load greater than the largest mixer came on the plant, we then have a recycle control which brings in the first units in conjunction with the large unit. So far, in the plants we have installed, none has used the large mixer for longer than a few minutes at a time and none has had loads greater than the largest mixer. Five of the plants have been installed and are giving fine results. (The latest is located at Hudson, N.Y.)

On the operation of the venturi mixers, we control them by specially arranged mercury type switches. Selection of the proper size mixer is by pressure variation in the surge tank and, in the matter of a low-pressure system, we have such a system in operation that operates with a range of ¼-in. variation between the minimum and maximum make range. This would mean that with 6-in. distribution pressure the total variation would be 6 to 6¼ in. from bottom to top. Each mixer is wired as a separate mixing unit, and should something go wrong it would affect that mixer only. The plant does not depend upon a single selective arrangement which would throw the total plant out by failure of the one unit.

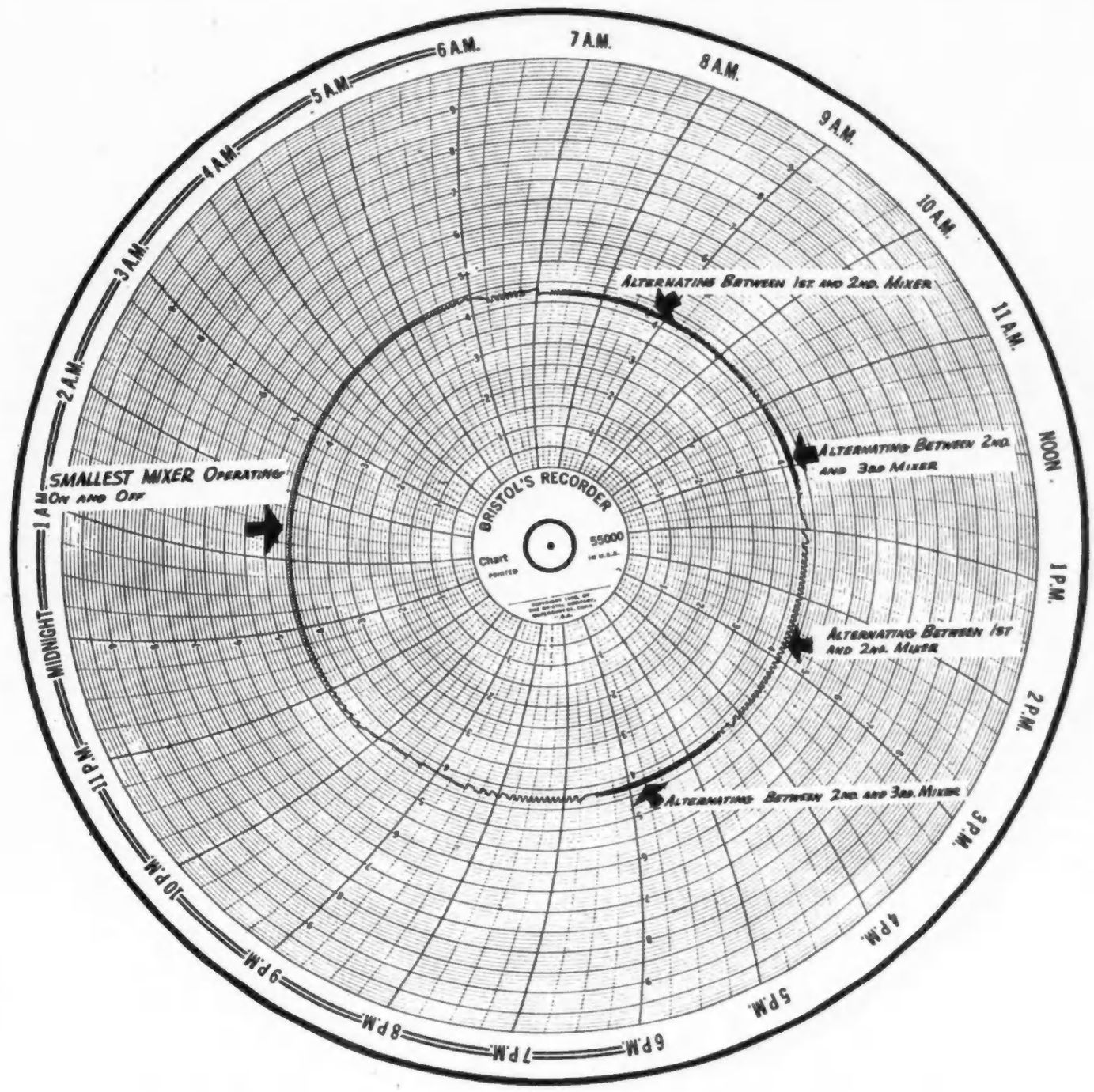
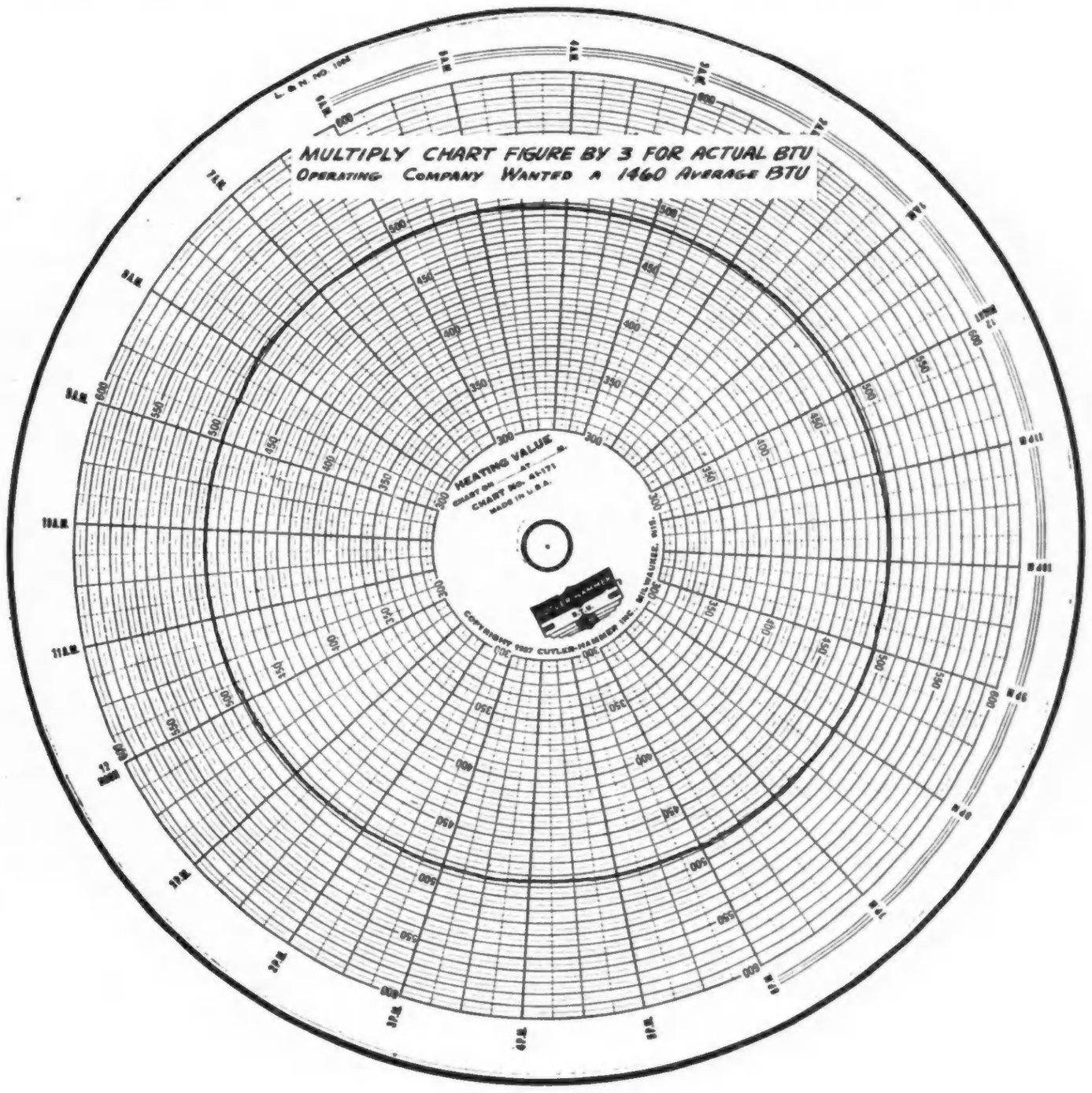
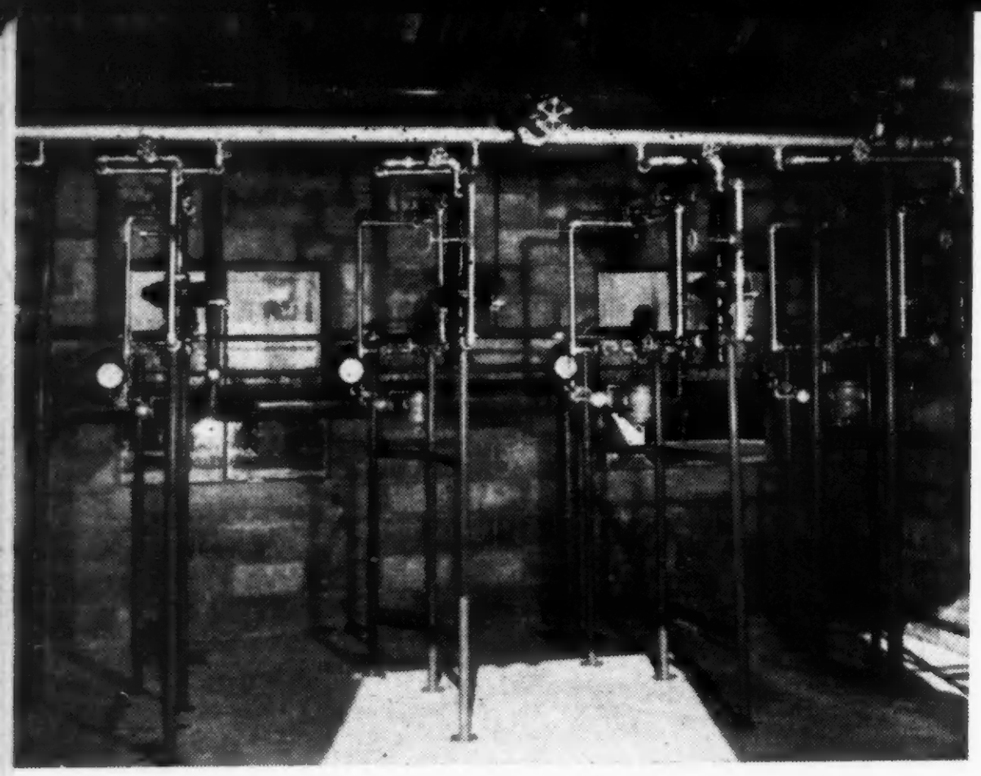


Fig. 1 (above) Typical pressure chart. Fig. 2 (below) Typical Btu-control chart.


MULTIPLY CHART FIGURE BY 3 FOR ACTUAL BTU
OPERATING COMPANY WANTED A 1460 AVERAGE BTU
HEATING VALUE
CHART No. 41-171
MADE IN U.S.A.
CUTLER-HAMMER

On the operation of the venturi mixers, we control them by specially arranged mercury type switches. Selection of the proper size mixer is by pressure variation in the surge tank and, in the matter of a low-pressure system, we have such a system in operation that operates with a range of ¼-in. variation between the minimum and maximum make range. This would mean that with 6-in. distribution pressure the total variation would be 6 to 6¼ in. from bottom to top. Each mixer is wired as a separate mixing unit, and should something go wrong it would affect that mixer only. The plant does not depend upon a single selective arrangement which would throw the total plant out by failure of the one unit.

Fortunately, because of an affiliation with a utility group, we were able to



At left, the mixing room installation of the Hudson, N.Y., plant using the Peacock design in operation for New York Power & Light Corp.

install a modified form of the present plant for experimental purposes and by that experimental plant were able to observe actual operations and iron out any 'bugs' in the design. The experimental plant is still in use now as the main gas supply for the particular plant.

The system lends itself to any desired Btu and pressure desired, the pressure being controlled somewhat by vapor pressure requirement and the Btu of the gas. With 1450-Btu mixture (which is approximately an exchange for natural gas) we can get a 4- to 4½-lb pressure with a 30-lb vapor pressure. At 530 Btu we can get approximately 1 lb with the same vapor pressure. We try to hold the vapor pressure down to 30 lb because of weather conditions which would require considerable vaporization if we attempted to maintain a higher pressure.

We incorporate with the plant another feature[1]: a temperature equalizing arrangement. In this, we bring the vapor and the air that is used in the gas-air mixture to approximately the same degree temperature and thus eliminate much of the fluctuation that comes from the variations in temperatures. To accomplish this exchange, we use a section of finned pipe as the vapor supply line to the various mixers and around this we have installed an air duct of proper size. Connected to the air duct, we have lateral air lines which connect with the venturi suction air connection. The main duct leads to the outside and has also a connection with a damper so that air may be taken from either the outside or the inside of the mixer room. At one mixer air pipe we have a small air duct that goes down to within ½ in. of the floor; this acts as a ventilator to keep vapors picked up from the floor. The suction on the duct draws the leakage into the mixer.

In the main vapor supply line we have a drip connection with finned pipe which is used to catch any small quantity of vapor that might condense to liquid in the winter. Such condensation would normally revaporize from the room temperature, but we also use an armored electric heating cable around the pipe for supplying heat to revaporize. Controls for the cable are in the electrical control room and outside the gas mixing room. This drip and heater are also under patent application.

Operation of all mixers is into a surge tank at the desired pressure. Load demands are met by a selective arrangement as pointed out above, which will change automatically from one mixer to another in selecting the size nearest the load demand of any given time. In the illustration already given, if the actual load demand should be 7.5 Mcfh, such load would be met by the 5-Mcfh unit and the 10-Mcfh unit operating back and forth. A further illustration of this *(see Fig. 1)* is a typical pressure chart from the plant at Hudson, N.Y.

Btu Control

Because of the temperature equalizing arrangement, we are able to maintain constant Btu control over the plant with a minimum of adjustments. We use a Cutler-Hammer Thermeter Btu recorder, but it does not control anything. *Fig. 2* is a typical chart taken from the operations at Hudson, N.Y., which must be multiplied by 3 to get the actual Btu value because C-H does not make a correct chart for the 900-1800 range of the instrument. At Hudson the operator wanted 1460-Btu sendout and this would read approximately 487 on the chart. The high on the chart is 493 or 1479 Btu while the low is 485 or 1455 Btu. This is a variation of less than 1%, plus or minus, and Cutler-Hammer doesn't guarantee the instrument normally closer than 1% and on that Btu at 2%. Thus, the variation can easily be traceable to errors in recording rather than actual variations in the Btu of the gas.

The plant arrangement is such that the operation can be connected directly into the distribution system through a surge tank, or into a surge tank at a pressure higher than the distribution pressure; then a distribution governor can be installed at the surge tank outlet to give whatever pressure desired. We have one plant installed operating with this governor reducing the surge tank pressure of 1 lb down to inches of pressure. By using this system and an automatic loader on the governor—such as the Smyly loader—the operators can get whatever pressure they desire without changing the plant pressure settings.

Some of the obvious applications of the plant would be:

1. Where a town has grown away from the existing plant and it is desired to relocate it. The plant could be installed at a more central point in the system and any necessary connecting lines made to the system. All construction work could be completed without interruptions at the old plant. We have installed three of the plants to meet such conditions.

2. Where a town or even a remote section of a system is supplied by a transmission line from another plant not located at that section. Often the load conditions have outgrown the transmission line capacity and also the unaccounted-for from the transmission line and the compressing costs have been great. The plant could supply the town or section and eliminate the transmission line.

3. Under (2) above the base plant is often overloaded and cannot meet the total gas demand. Our plant could supply part of the load by removing certain towns or sections from the main plant.

4. Quite often a town system purchases all gas from another plant and finds the quantity supplied is insufficient or at too great a cost. Such towns can now install an inexpensive automatic plant and make their own gas.

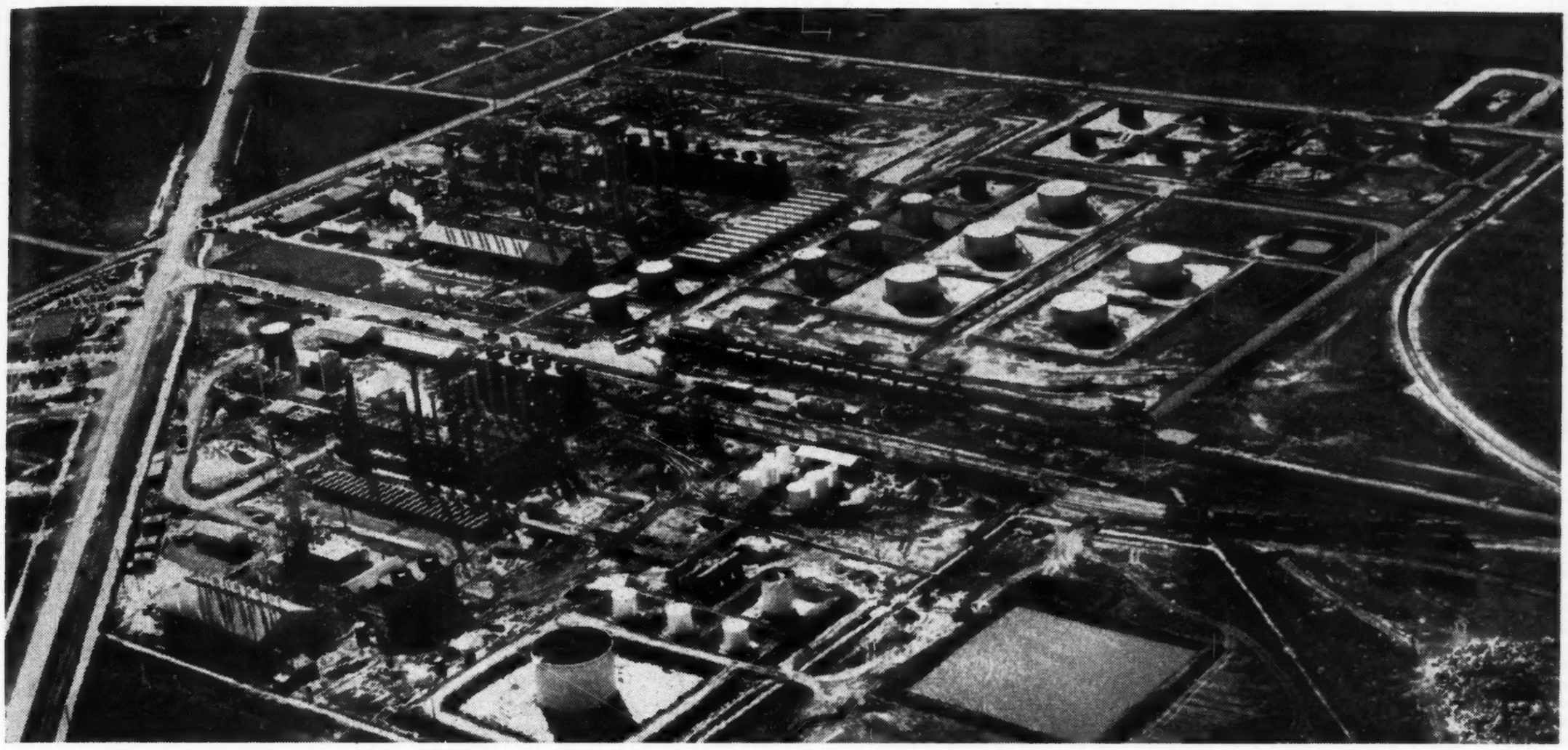
5. Where existing plants have worn-out holders and find the cost of new ones too great our plant can be used and the worn-out holder abandoned.

6. In climates and especially with smaller companies where weather conditions make holder heating a problem in winter the holder can be abandoned and our system installed to replace the existing plant.

7. In systems having natural gas or anticipating natural gas the new demand rates make it necessary that the company have a peak load plant. This plant works in to supply an exchange gas for the natural gas and thus shave the demand and the high demand penalties. In some cases the plant can be paid out in savings of a couple years. It is also a standby plant for natural gas failure.

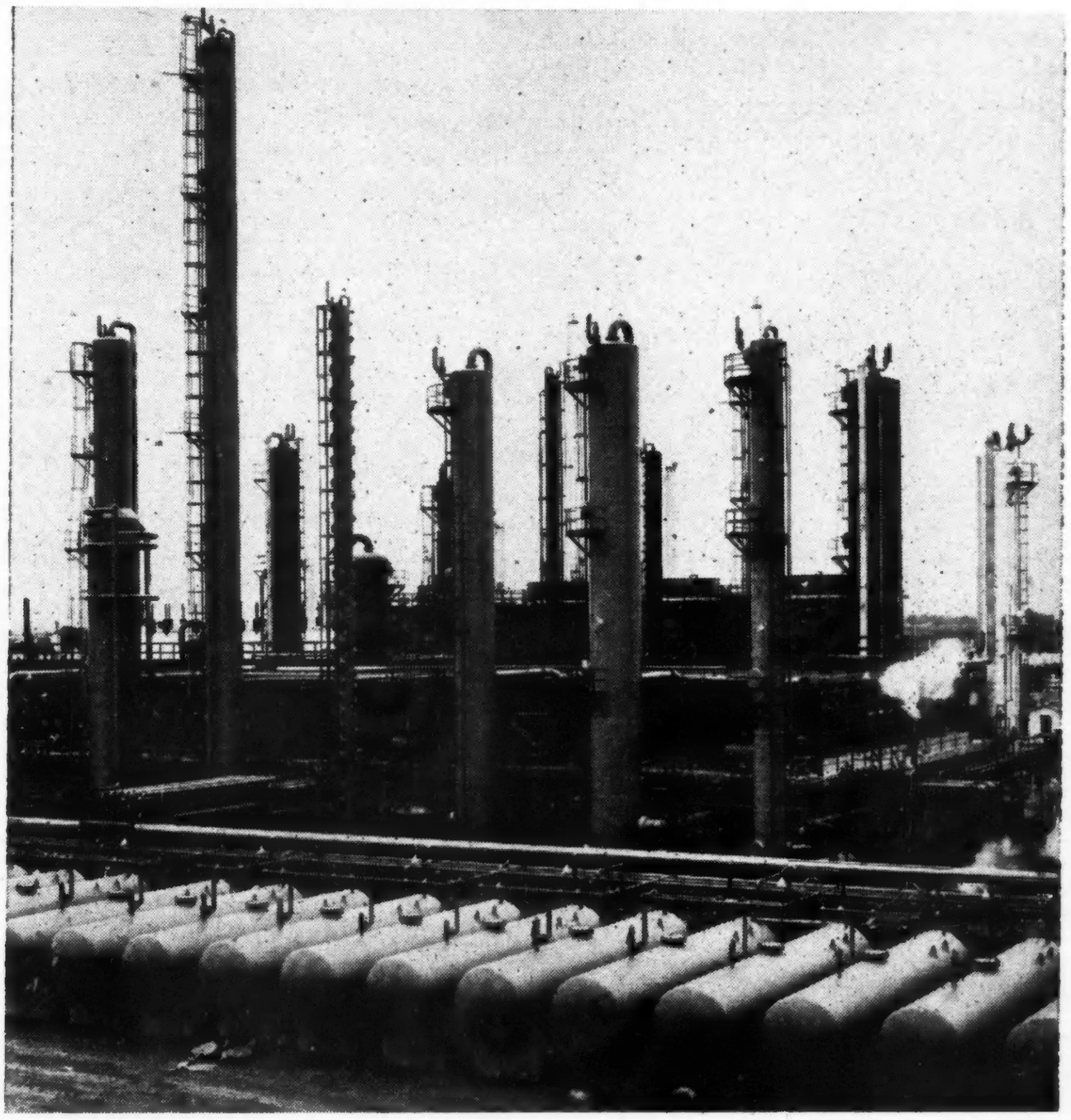
8. For industrial standby or peak load plants the system takes part of the gas company load during peak periods and helps keep customers who might otherwise convert to oil or other fuel.

[1]Patent applied for.



Air view of processing plant at Winnie, Texas, with absorption plant in background and chemical plant in left foreground.

HOW NATURAL GAS YIELDS ORGANIC CHEMICALS



Methanol, formaldehyde, and acetaldehyde are produced by controlled oxidation of stripped natural gas in McCarthy Chemical Co. plant.

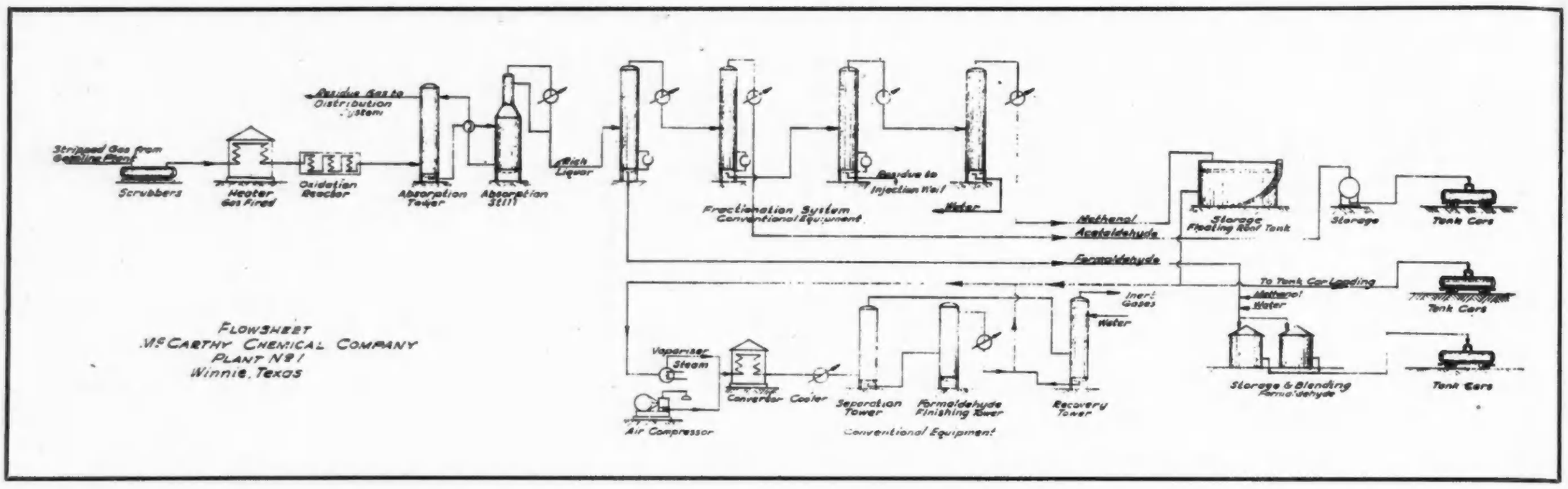
McCARTHY Chemical Co.'s first plant, several months ago opened at Winnie, Texas, represents another step toward the fuel utilization of one of America's most valuable natural resources, natural gas.

It was not many years ago that in Texas, gas had such little value that its sale would not pay its transmission cost from the field, and most of it had to be flared. Today, however, the situation has changed, and gas has wide use in the Gulf Coast area as a low cost fuel and as a raw material. Its availability is in a large measure responsible for the tremendous industrialization that has taken place in this area in recent years. Glen McCarthy's Winnie operation is an outstanding example of this full use of natural gas.

The McCarthy Chemical Co. is the direct outgrowth of the operations of the McCarthy Oil & Gas Corp. in the southeast Texas coastal area of the Houson - Beaumont - Galveston triangle. In the process of the development of the oil and gas fields of this area, it became apparent that there were excellent possibilities for the further utilization of natural gas other than the usual production and distribution activities common to the industry.

On Stream in 1945

The first step was the construction of the present absorption plant which went on stream in November, 1945. A thorough study of the local and national chemical markets and of the relative location of the McCarthy interests in this area, showed that a chemical



FLOWSHEET
McCARTHY CHEMICAL COMPANY
PLANT No. 1
Winnie, Texas

plant utilizing natural gas components could be of considerable advantage both to the McCarthy interests and to the chemical industry.

To realize the benefits indicated in such studies the McCarthy Chemical Co. was organized in October, 1946, to construct and operate a plant for the production of oxygenated hydrocarbons. Utilizing the wartime development of low-cost oxygen plants, new processes and techniques were made available to the McCarthy Chemical Co. and as a direct result the chemical plant known as Winnie No. 1 has come into existence.

Flow of Gas

The connection between the chemical plant and the other McCarthy production and distribution interests in this area is as follows: Gas is produced principally from the two areas, the Stowell area in the vicinity of Winnie, and at Jackson Pasture at Galveston bay. By means of gathering system, high pressure gas is brought in from the Jackson Pasture field, and both high pressure gas and casing head gas from the Stowell fields. This gas, along with the distillate, is processed in conventional type absorption plants and the residue gas is fed to the new chemical plant, where by means of a direct oxidation process, the heavier components of the natural gas are converted to alcohols and aldehydes.

The residual gas from this plant passes directly to the pipeline distribution system through the lines of the Jefferson Pipe Line Co. to domestic and industrial consumers in the Beaumont, Port Arthur and Orange areas. The four elements of this scheme, the production of gas, the extraction of the conventional petroleum products, the production of chemicals, and the distribution to the pipeline system, while closely integrated, may be operated entirely independently of each other, thus insuring the utmost in flexibility of operations.

This new chemical plant represents the latest advances in the petroleum chemical field and combines the know-how and principles of well established refinery operations with the exacting requirements of the finished chemical industries. The products of this plant are all classified as primary or intermediate type of chemicals for conversion to finished products elsewhere.

The finished products of the chemical plant are formaldehyde, methanol and acetaldehyde. The first product, formaldehyde, finds its use in plastics, dyes, explosives, and various chemical applications. Approximately 70% of the formaldehyde is used in the production of plastics, notably those of the phenolic type.

Methanol is used as such as a cheap anti-freeze and in the production of formaldehyde and other chemicals. Acetaldehyde is used in the production of protective coatings, paints and varnishes and in chemical synthesis.

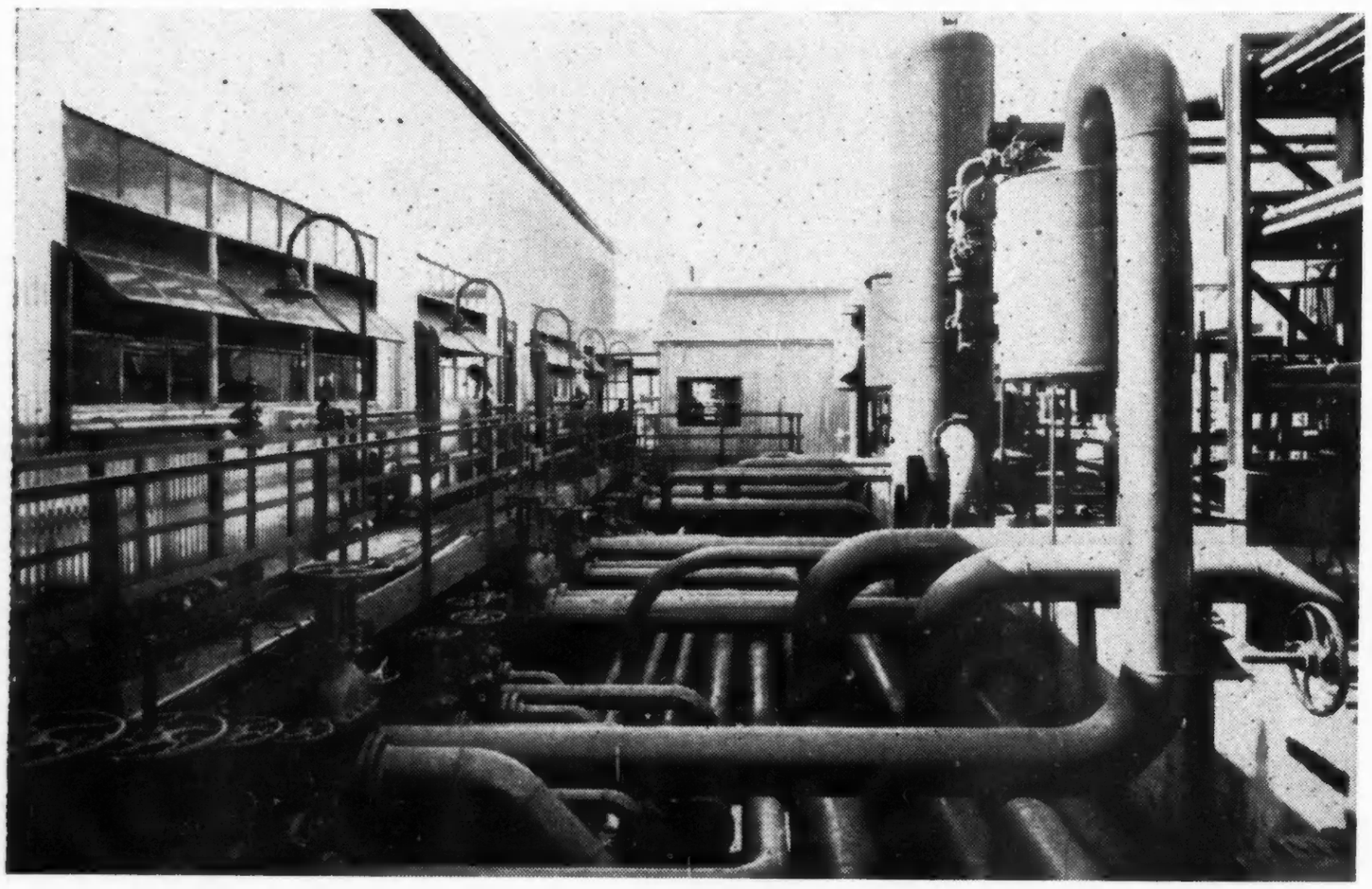
Production of oxygen from air is carried on at the plant site on a tonnage scale. The installation is one of the largest of its type in the world and uses a low temperature process in which temperatures as low as —300° F are encountered. Air is first liquefied and subsequently fractionated to produce 175 tons of 95% pure oxygen daily. Crane 150 and 300-lb steel valves on the oxygen lines were specially degreased and packed with dry asbestos to minimize fire hazards.

Fuel Properties Intact

The bulk of the equipment in the large oxygen unit is necessarily built of aluminum.

In going through the two plants, the volume of the gas is not greatly reduced, and it retains virtually the same fuel properties. Thus, although it has yielded great quantities of conventional petroleum products and petro-chemicals, most of the gas is still available for sale as fuel.

Reprinted through courtesy of Crane "Valve World."



View of manifold pit in new 175-ton-per-day oxygen plant.

HOLDERS: Conventional, Pipe, and Bottle Types

A Study of Comparative Costs

This treatment of the paper titled "Pipe Batteries: A Study of the Comparative Costs of Storing Natural Gas in Conventional Holders and in Pipe Holders and Bottle Holders" has been abridged for reasons of space limitations. A brief consideration of types of peak loads plus some two dozen tables have been omitted from the original paper, prepared by the three authors—all of Southern Counties Gas Co., Los Angeles—for presentation at the AGA Natural Gas Department spring meeting in French Lick Springs, Ind., last May. En toto, the study is almost a textbook on the subject. As presented here, the editors feel it presents an excellent basis for application by individual companies.

AN engineering and economic study has been made by the engineering departments of the Southern California Gas Co. and the Southern Counties Gas Co., Los Angeles, on the design of pipe holders to determine the effect on costs of such operating conditions as gas pressure available at the intake of the holder station compressors, the discharge gas pressure required to deliver gas into the distribution system, and the frequency with which the holder station is to be operated. The study shows that under some conditions a very large saving in the cost of storing natural gas in holders can be effected by the use of pipe or bottle holders. Consequently, a re-examination of the use of holders for providing peak load gas is called for.

For the purposes of this article, low pressure holders are defined as the conventional water-seal type, lift holders or the waterless type such as the tar-seal piston-type holders. The cost data given in this paper are for water-seal type holders because the capital cost of this type of holder is less than the other types of conventional low-pressure holders. However, the differences in the cost of the different types of conventional low-pressure holders are small compared to the differences between low-pressure holders as a class and other types of holders. The conclusions reached in this paper can therefore be applied to all conventional type low-pressure holders.

High-pressure tank-type holders are those fabricated in the field from plates, and ranging in diameter from 30 to 50 ft. They usually operate with a maximum working pressure of from 50 to 75 psi. The class includes spherical as well as cylindrical type holders, although all cost data given herein for this type of holder are for the cylindrical type.

We define pipe holders as holders fabricated from commercial gas line pipe. Such holders in a typical case would consist of a battery of inter-connected tanks 24 in. to 34 in. in diameter and from 200 to 400 ft in length. They are usually installed under ground.

Bottle holders consist of a battery of seamless steel bottles 24 in. O.D. by approximately 40 ft in length with hemispherical heads. These bottles are completely fabricated and tested in the manufacturers' plant and only have to be placed in position and connected together with small pipe in the field. Several large installations of this type have been made by the Public Service Co. of Northern Illinois and described by D. V. Meiller and M. G. Markle.

It is interesting and important to realize that, assuming a perfect gas is to be stored (for this purpose a gas which conforms to Boyle's law over the pressure range in which the holder operates) and for a given design stress, the weight of steel required per unit volume of gas stored in a cylindrical pressure vessel is a constant which is not affected by the diameter, the length, or the maximum working pressure for which the vessel is designed.

The weight of steel required for a low-pressure holder will be greater than that for other types of the same capacity when considered from this theoretical standpoint because of the weight of the steel required for the water tank and guide frame. The weight of steel in a spherical holder will be less per unit of capacity than for a cylindrical holder. The design of a gas holder involving cylindrical pressure vessels will be good or bad, therefore, depending upon the skill by which the design takes into account such factors as the following:

(1) Variations in fabrication and erection costs per ton of steel for holders of different types.

(2) Minimum yield strength of steel available for the type of holder to be constructed.

(3) Deviation of the gas to be stored from Boyle's law at the maximum working pressure of the holder.

(4) Compression costs.

(5) Gas pressure available at intake of holder.

(6) Pressure at which gas must be delivered from the holder into the distribution system.

(7) The number of operating cycles (full to empty and back to full again) through which the holder will be required to operate each year.

(8) Maintenance and operating costs.

(9) Adaptability to the available site for the holder.

In the light of the statements made in the foregoing section, it might be assumed that the weight of steel required to provide storage for a given quantity of gas would be the same in a pipe holder as in any other type. However, because of the effect of certain of those factors referred to in the foregoing section, this is not the case. The tons of steel per unit of storage capacity can be much less with pipe holders than with conventional types for the following reasons:

(1) It is feasible to design pipe holders for operating pressures as high as 1600 psig, and at such pressures deviation from Boyle's law for most natural gas makes it possible to store approximately 45% more gas in a given container than could be stored if the gas acted as a perfect gas.

(2) For reasons which will be discussed later, it appears entirely feasible from an engineering and safety standpoint to design pipe holders for much higher working stresses than is permitted under the pressure vessel codes under which other types of holders are normally constructed.

(3) Because of the cold working process to which commercial

By F. A. HOUGH, W. C. MOSTELLER, and R. O. RANDALL

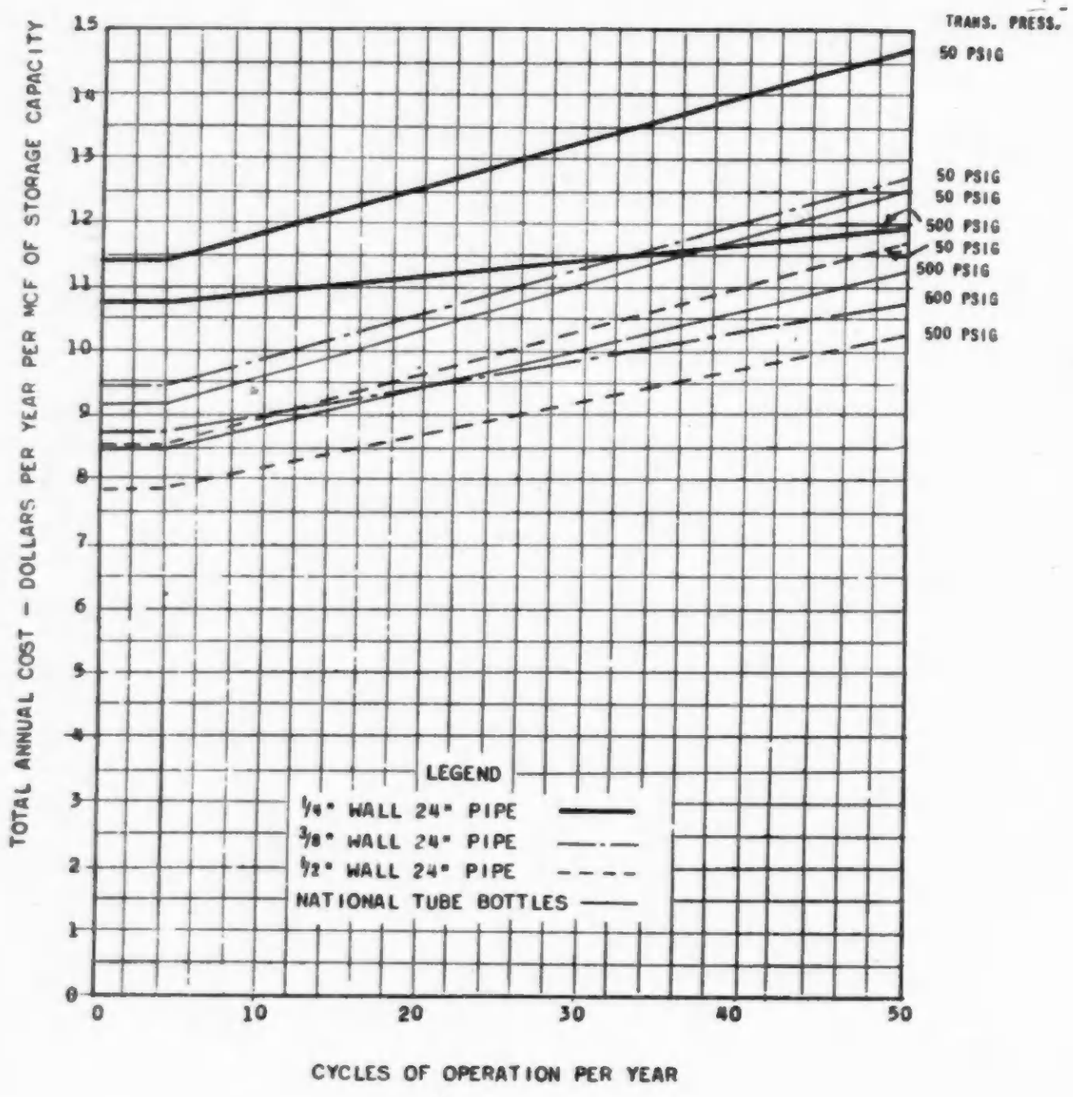


Fig. 1. Total annual cost for 24-in. bottle holders and 24-in. pipe holders—ASA code for pressure piping, section 2, division 2. Filling time: 7 days per cycle.

large diameter pipe made by some manufacturers is subjected, steel with a minimum yield strength considerably higher than that obtainable in tank plate can be used without precluding the field welding of the steel.

In addition to all of these factors which tend to reduce the weight of pipe holders as compared to conventional type holders, there is another factor which tends to reduce materially the cost of pipe holders. Pipe, because it is manufactured by production line methods in highly mechanized plants, can be purchased and fabricated into holders for a lower cost per ton installed than can conventional type holders. These factors tending to reduce the cost of pipe holders are offset in part by higher compression costs in some cases for pipe holders. However, as will be shown later, the installed cost of pipe holders and the necessary compressor equipment is less under most operating conditions than is the cost of conventional type holders.

Fig. 2 . Total annual costs for 24-in. bottle holders and 24-in. pipe holders—ASA code for pressure piping, section 2, division 2. Filling time: 10 hours per cycle.

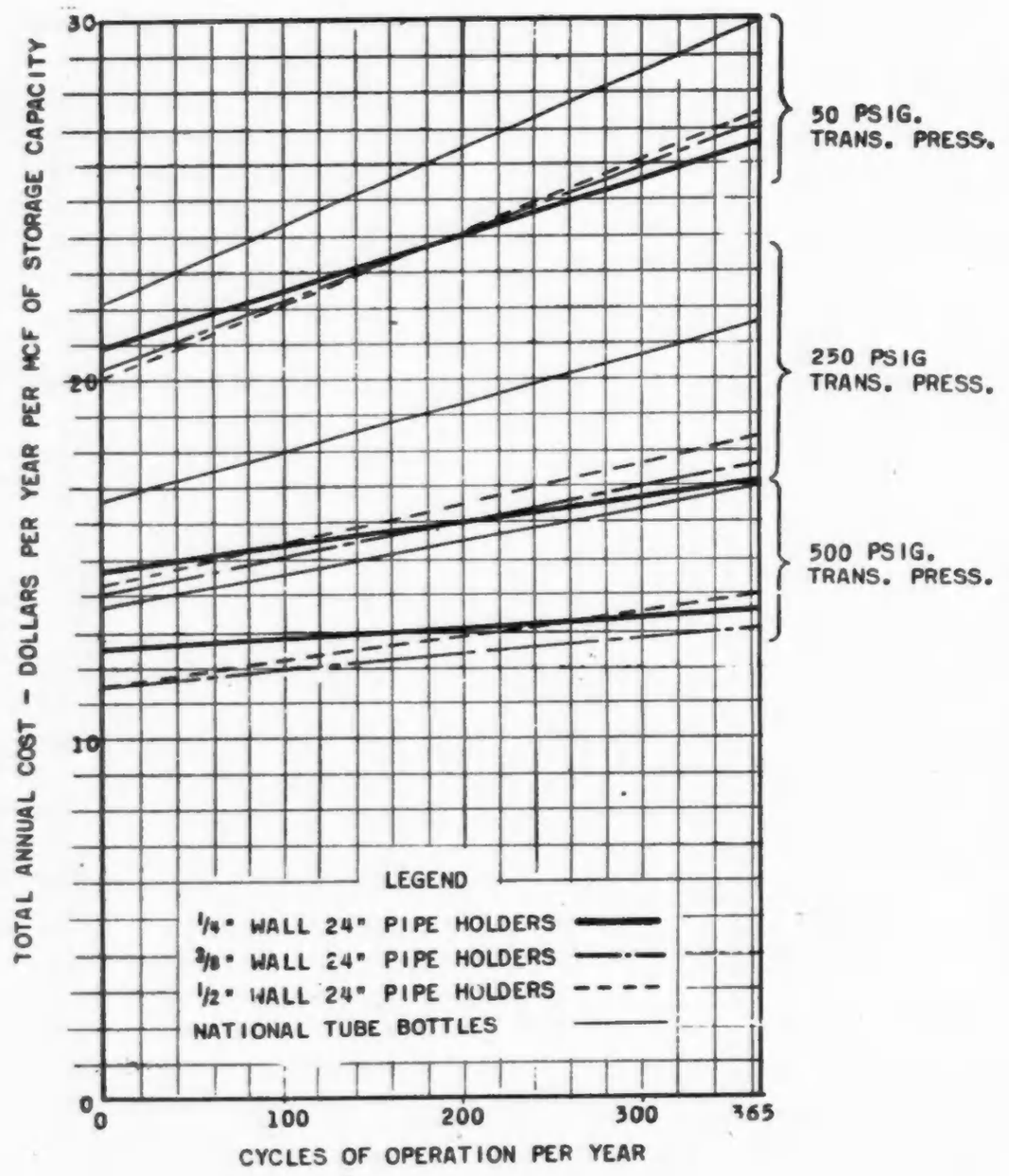

TOTAL ANNUAL COST – DOLLARS PER YEAR PER MCF OF STORAGE CAPACITY
CYCLES OF OPERATION PER YEAR
50 PSIG. TRANS. PRESS.
250 PSIG TRANS. PRESS.
500 PSIG. TRANS. PRESS.
LEGEND
¼" WALL 24" PIPE HOLDERS
⅜" WALL 24" PIPE HOLDERS
½" WALL 24" PIPE HOLDERS
NATIONAL TUBE BOTTLES

Fig. 6 shows the tons of steel required to store 10 MMcf of natural gas in a pipe holder for different design pressures ranging from 200 psig maximum working pressure to 5000 psig maximum working pressure. The top curve is for a holder designed in accordance with the API-ASME code for pressure vessels; the middle curve is for a holder designed in accordance with division 1, section 2, of the ASA code for pressure piping; and the lowest curve is for a pipe holder designed in accordance with division 2, section 2, of the ASA pressure piping code.

Optimum Design Pressure

This chart brings out two very important facts. The first is that, regardless of the diameter of the pipe used, the weight of steel required reaches a minimum for a design involving a maximum working pressure of approximately 2000 psig. It is therefore evident that there is no reason for considering working pressures much higher than this figure since such designs would require a great tonnage of steel per unit of capacity and there are no offsetting economies resulting from going to higher pressures. (NOTE: The composition of the gas to be stored will affect the value of this optimum design pressure.)

Fig. 6 indicates another very important point in connection with the economics of storage of gas in pipe holders. It indicates that for any given working pressure, the weight of steel required by the API-ASME code is about 2.5 times that required by division 2, section 2, of the ASA code for pressure piping. The question as to what code should be applied to the design of pipe holders is one that is now receiving considerable attention by regulatory authorities and code committees.

Pipe holders are, without question, pressure vessels and it might be argued that the same code should be applied to their design as to other pressure vessels. However, they are manufactured from the same materials from which pipelines are built and when such holders are buried, their environment and service conditions so closely parallel those of transmission lines that there can be no technical or engineering basis for using a different design stress for this type of holder than is used for pipelines located in similar territory.

Selection of Area

It should be noted that, since it is feasible and usually desirable to place pipe holders on private property, a utility can sometimes, by carefully selecting a site and acquiring a large enough site, provide conditions that warrant using division 2 of the pressure piping code even though the holder is actually located within a metropolitan area.

Commercial line pipe is available for which the manufacturers will guarantee a minimum yield strength of 52,000 psi for wall thicknesses up to and including ½ in. When we endeavor to use wall thicknesses in excess of ½ in., two handicaps are encountered: The guaranteed minimum yield drops to 43,000 psi or less, and the cost per ton of steel increases. Because of these factors, our cost analyses indicate that under some operating conditions, a pipe holder

design based upon a ½-in. wall thickness pipe is the minimum cost design, and that, from a cost standpoint, it is not desirable to use a greater wall thickness.

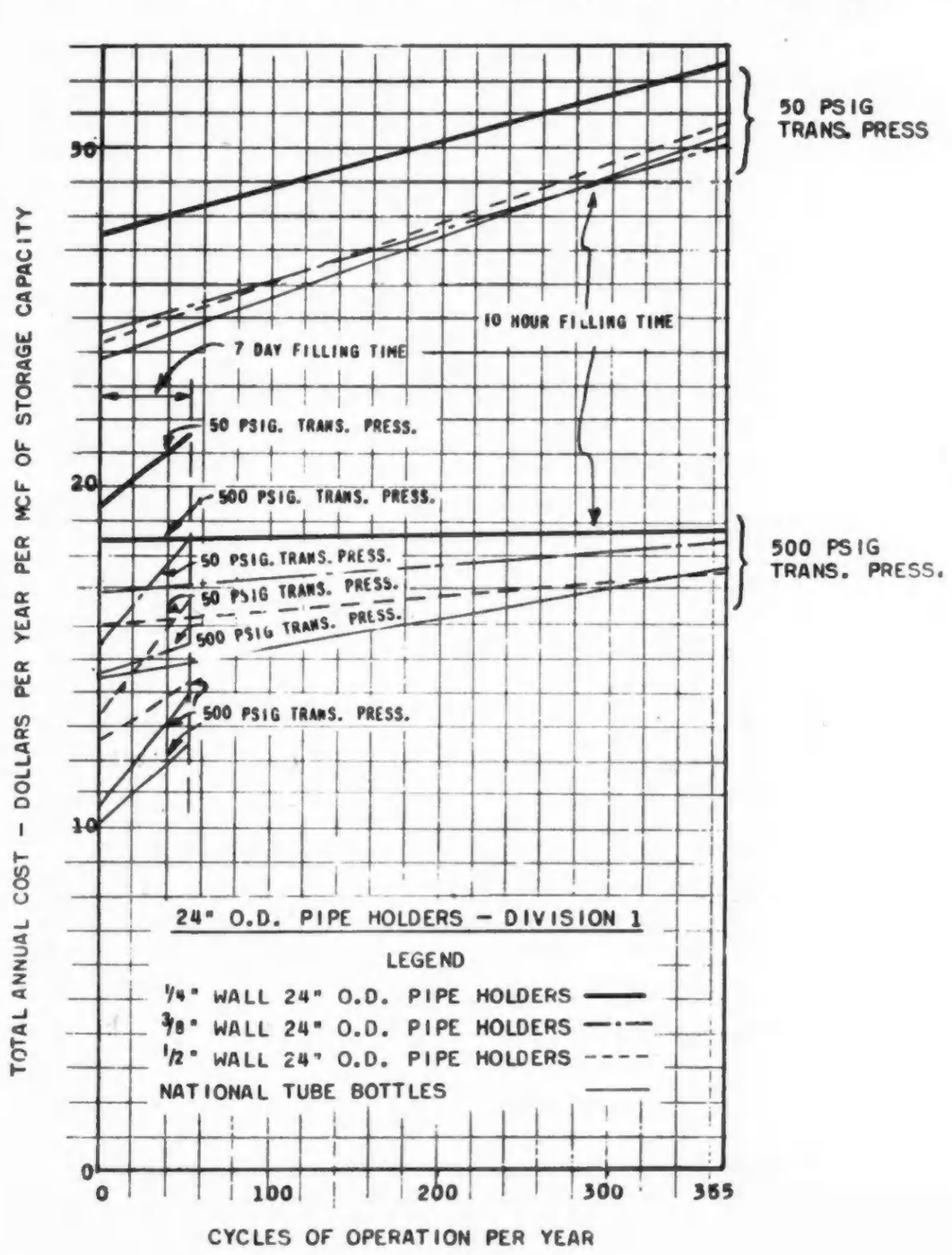
Generally speaking, the larger the diameter of the ½-in. wall pipe used, the lower the cost per unit of storage capacity, provided one stays within the diameter range for which commercial line pipe is available. All of the cost studies included in this paper are based on 24-in. OD pipe. This diameter was selected in order to eliminate the diameter variable when comparing the cost of pipe holders and bottle holders, and when comparing the cost of pipe holders made from electric weld pipe with those made from seamless. The bottles are available in 24-in. diameter only, and 24-in. seamless is the largest diameter currently available.

Determination of Cost

In some localities, 34-in. x ½-in. wall pipe with a 52,000 psi minimum yield might be available at no higher cost per ton than 24-in. x ½-in. wall. In such a case, the 34-in. pipe would give a somewhat lower cost per unit of capacity. However, the effect on cost produced by using different diameter pipe will be small and influenced very materially by the conditions surrounding a specific installation. It is not implied, however, that the economies that might be effected by going to larger diameter pipes are not well worth careful investigation.

Since pipe and bottle holders will generally have quite thin walls compared to other types of high-pressure holders, and since they are well adapted to and will usually be designed for high operating stresses, it is highly important that adequate steps be taken to prevent internal corrosion. For this reason, the cost of dehydration facilities has been

Fig. 3. Total annual cost for 24-in. bottle holders and 24-in. pipe holders—ASA code for pressure piping, section 2, division 1. Filling time: 10 hours per cycle, 7 days per cycle.



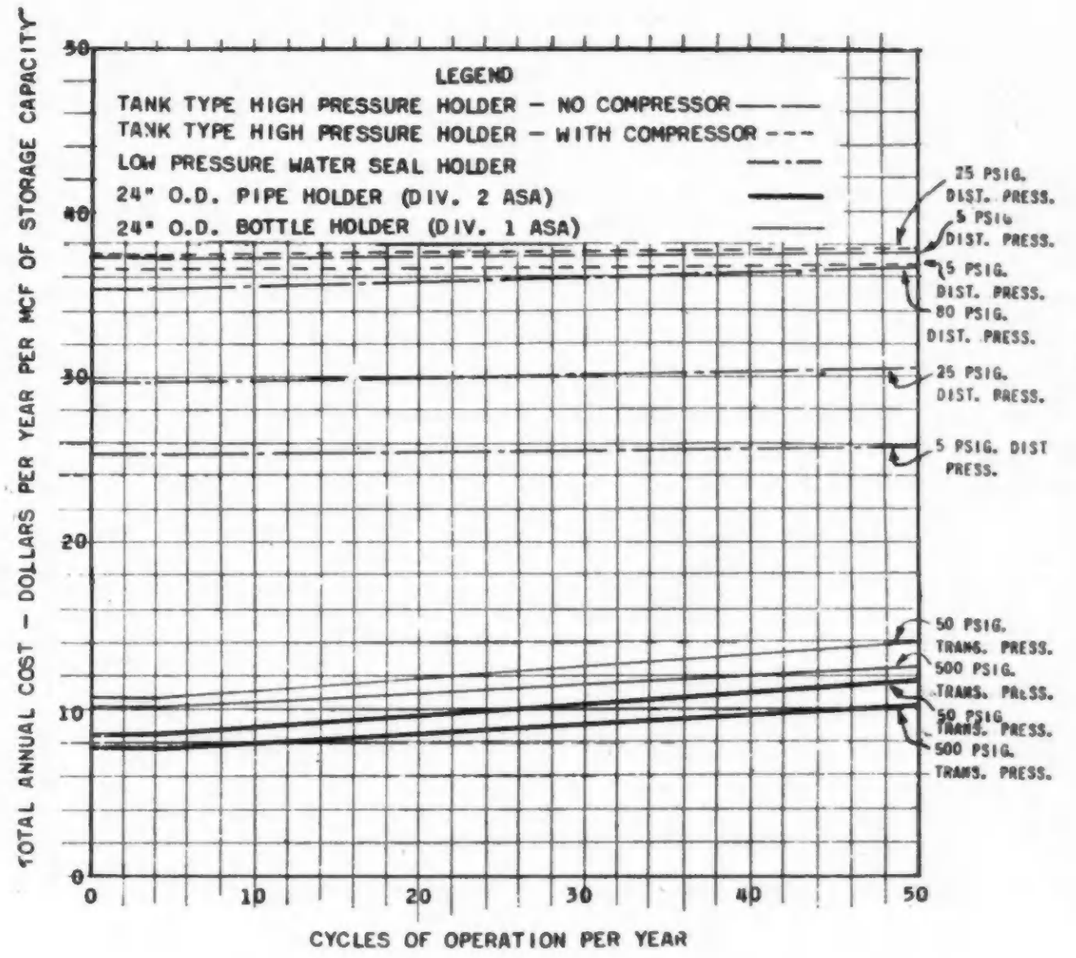

LEGEND
TANK TYPE HIGH PRESSURE HOLDER – NO COMPRESSOR
TANK TYPE HIGH PRESSURE HOLDER – WITH COMPRESSOR
LOW PRESSURE WATER SEAL HOLDER
24" O.D. PIPE HOLDER (DIV. 2 ASA)
24" O.D. BOTTLE HOLDER (DIV. 1 ASA)
25 PSIG. DIST. PRESS.
5 PSIG. DIST. PRESS.
5 PSIG. DIST. PRESS.
80 PSIG. DIST. PRESS.
25 PSIG. DIST. PRESS.
5 PSIG. DIST PRESS.
50 PSIG. TRANS. PRESS.
500 PSIG. TRANS. PRESS.
50 PSIG. TRANS. PRESS.
500 PSIG. TRANS. PRESS.
TOTAL ANNUAL COST – DOLLARS PER YEAR PER MCF OF STORAGE CAPACITY
CYCLES OF OPERATION PER YEAR
0
10
20
30
40
50

Fig. 4. Comparison of annual costs of several methods of gas storage for meeting peak loads.

included in our cost estimates for pipe and bottle holders. Dehydration serves the dual purpose of preventing internal corrosion and minimizing difficulties with hydrates when gas is withdrawn from storage.

Heating Gas During Withdrawal

The cost estimates do not in any case include facilities for heating gas as it is withdrawn from storage. If adequate dehydration is provided, it is probable that heating facilities will not be needed, except in the case of holders located in cold climates or holders operating at pressures in excess of 1000 psig. The composition of the gas stored will have an important bearing on whether or not heating facilities are needed. A high propane content will promote the formation of hydrates and create a need for heating in many cases. The incremental cost of heating facilities is not an important item in any case.

All pipe holder and bottle holder cost data are based on a design which provides for installing the tubes on 2½-ft centers. This leaves a clearance of only 6 in. between tubes. This arrangement minimizes the land area required, and is probably a satisfactory arrangement for cases where holders are designed for low operating stresses and located in closely built-up areas where land values are high. Pipe holders installed thus far in California have used this spacing.

Use of Wider Spacing

However, if a holder installation designed under section 2, division 2 of the ASA code for pressure piping is to be installed, it would probably be desirable to use a wider spacing primarily for the purpose of minimizing the effect on nearby tubes caused by the failure of one tube. Since holders designed under this division of the code will normally be located in sparsely settled areas, presumably, the cost of land will not be a serious item and, consequently, the use of greater spacing will not seriously affect the total cost of the installation.

The results of our cost study are shown graphically in *Figs. 1, 2,* and *3.* The figures show that, generally speaking, when a holder is designed strictly for standby purposes, i.e., when the number of operating cycles per year will be small, pipe holders with ½-in. wall thickness give the lowest annual cost for this type of holder regardless of whether

the holder is designed in accordance with division 1 or division 2 of the pressure piping code. As the number of operating cycles increases, the thinner-wall pipe holder costs come closer to those of the ½-in. wall pipe.

The charts show that when both pipe holders and bottle holders are designed in accordance with division 1 of the pressure piping code, the bottle type holders give somewhat lower costs, particularly when the operating cycles per year are few. On the other hand, when both types of holders are designed in accordance with division 2 of the code, pipe holders give lower annual costs in all cases than bottle holders.

Differences in Cost

The difference in cost between bottle holders and pipe holders for division 1 design are attributable to design details. In the design we have used as a basis for our cost study for division 1, pipe holders were assumed to have an 80% joint efficiency while the bottle holders, being made of seamless tubing, were designed for 100% joint efficiency. If a 100% joint had been assumed for the pipe holders, they would in most cases have shown lower costs than the bottle holders.

Having arrived at conclusions concerning the optimum design for pipe holders, it now becomes interesting to compare the cost of storing gas in pipe or bottle holders of optimum design with the cost of storing gas in conventional tank type holders and conventional low-pressure holders. *Figs. 4* and *5* show these comparisons graphically. These figures show that in practically all cases, and under all conditions studied in this report, pipe or bottle holders give lower annual costs than any of the holders of conventional type. In cases where holders are designed for standby service, pipe and bottle holders will give annual costs of less than a third of the annual costs resulting from the use of conventional type holders.

The installed cost for pipe and bottle holders for standby

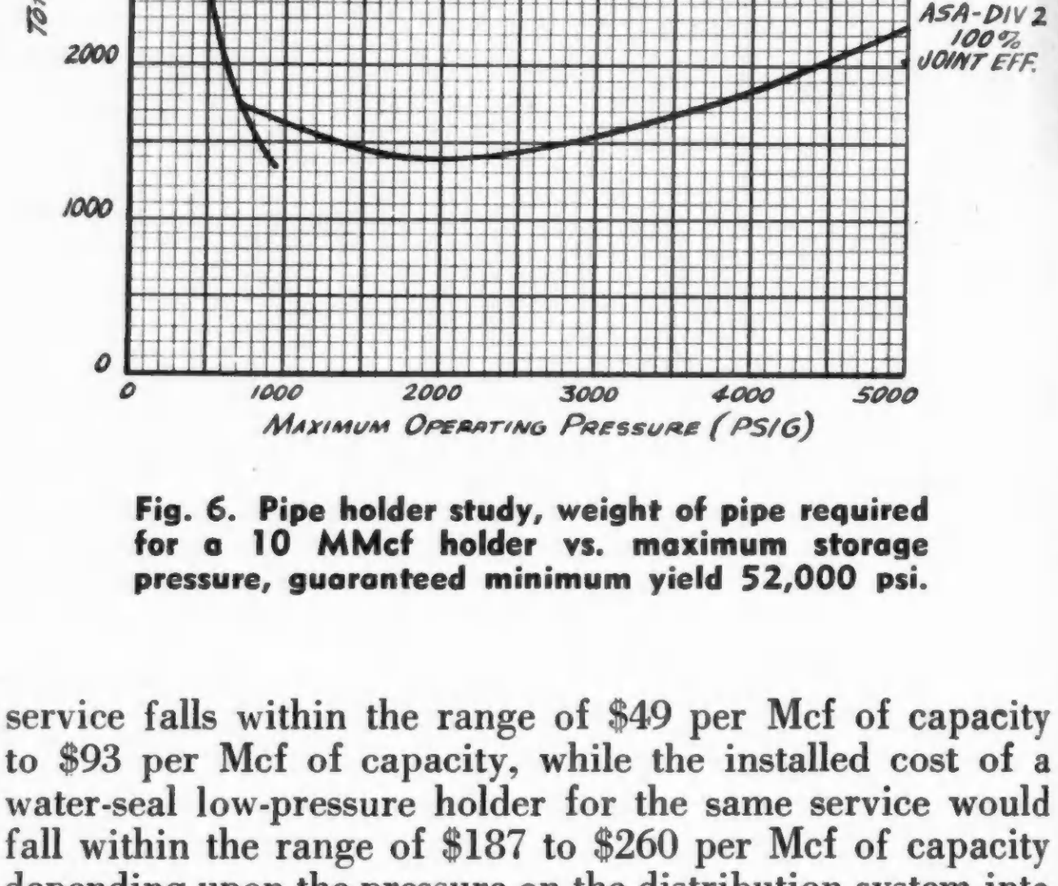


Fig. 6. Pipe holder study, weight of pipe required for a 10 MMcf holder vs. maximum storage pressure, guaranteed minimum yield 52,000 psi.

service falls within the range of $49 per Mcf of capacity to $93 per Mcf of capacity, while the installed cost of a water-seal low-pressure holder for the same service would fall within the range of $187 to $260 per Mcf of capacity depending upon the pressure on the distribution system into which gas must be delivered from the holder. The total annual costs for a pipe or bottle holder for standby service will fall within the range from $7.80 per Mcf per year to $14 per Mcf per year, depending upon the number of operating cycles and the code under which the holders are designed.

Cost of Water-Seal Holders

A water-seal holder under the same conditions would produce total annual costs ranging from $26 per year per Mcf of capacity to $36 per year per Mcf of capacity, depending upon the pressure carried on the distribution system into which gas must be delivered from the holder.

It is evident from these figures that by the use of pipe or bottle holders the extent to which holders can be used to provide peak-load gas can be considerably greater than would be the case if we were limited to the use of conventional type holders. It was surprising to us to find that pipe or bottle holders give lower annual costs than conventional holders, even in cases where the holders are to be operated each day, although, of course, the savings to be effected by the use of bottle or pipe holders for daily operation are much less than those made when pipe or bottle holders are used for standby.

In addition to the cost advantage, pipe and bottle holders have another very important advantage and that is that they can be installed underground and are thus out of sight. This feature makes it possible to locate such holders in places where it would not be possible to obtain permits to build conventional aboveground holders.

COMPARISON OF ANNUAL COSTS OF SEVERAL METHODS OF GAS STORAGE FOR MEETING PEAK LOADS

FILLING TIME – 10 HOURS PER CYCLE

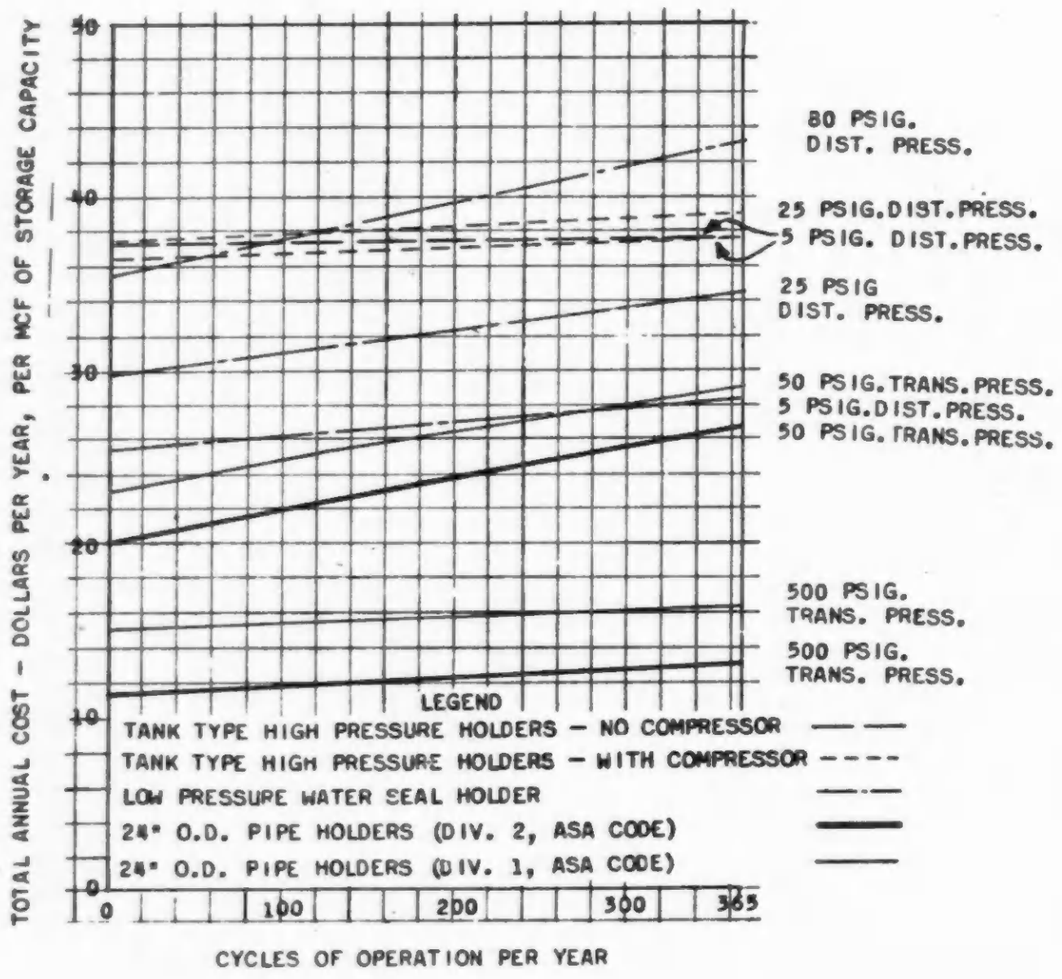
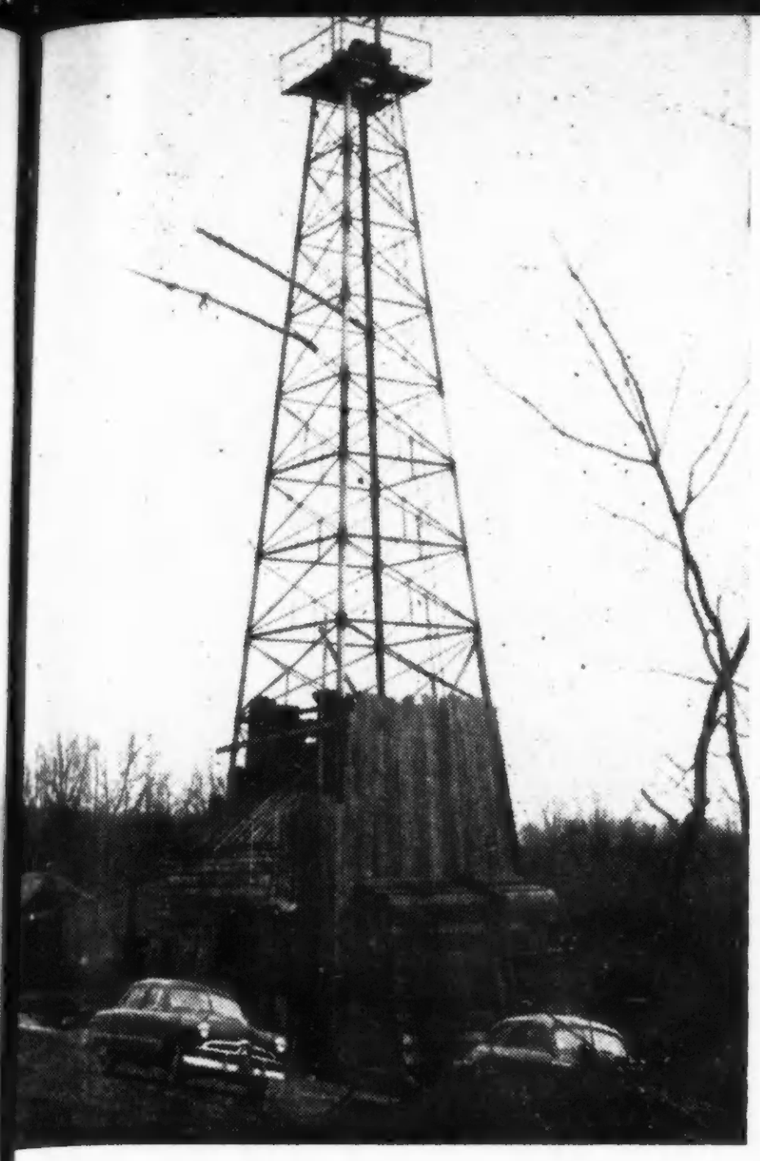


Fig. 5. Comparison of annual costs of several methods of gas storage for meeting peak loads. Filling time: 10 hours per cycle.



Company Drills 10,000 Ft, Finds Gas—At 7000 Ft

By C. J. McMAHAN

AFTER completing the deepest well ever drilled in the world with cable tools—reaching a depth of 10,312 ft below the surface—The Manufacturers Light & Heat Co. encountered many difficulties and decided to abandon. But, in the process of abandoning the well and salvaging materials, we found natural gas at around 7000 ft. Today this well is classed as a good producer.

Exclusive

This unusual history of well drilling extends some 13 years. To fully appreciate this unique achievement, a brief review is in order on the search for natural gas in Fayette county, Pennsylvania.

Between 1936 and 1940, there was considerable well drilling in the area adjacent to the community of Uniontown. About this time, our company decided to explore further a section of Chestnut ridge. This section is a mountain ridge, 2588 ft above sea level, about eight miles south of Uniontown's Summit hotel. In the south end of this ridge we discovered a gas pool.

The Barton No. 1 well was drilled in this section of Georges township, Fayette county. It was completed in May 1942. Contractor J. A. Fox of Washington, Pa., brought the well in for the gas company. It had an initial open flow of 1,785,000 cu ft per 24 hours; a rock pressure of 3280 lb per sq in., and had reached a depth of 7285 ft. The gas was coming from the chert just above the Oriskany sand.

This production encouraged us to expand drilling plans. Barton No. 2 was drilled—it was a dry hole. The William Barton estate property was again selected and Barton No. 3 was drilled. It, too, was a dry hole.

Our company, like all natural gas companies, was urgently in need of increased gas supplies. A good producer in western Pennsylvania would help materially in supplying the needs of our thousands of customers in western Pennsylvania, particularly our industrial customers who were then in war production.

We continued drilling on this property. Barton No. 4 through Barton No. 7 were brought in. These four wells were good producers. Gas was found at about the same depth as Barton No. 1 and flow was rated satisfactory.

On June 10, 1947, we located Barton No. 8. Drilling started on Sept. 1, 1947. This is the well that took a great deal of our time, money, and effort in the next 22 months. Contractor Fox eventually aided us in breaking our former cable tool record with the 10,312-ft Barton No. 8. In December 1944, working for us on the Hockenberry farm near Slippery Rock, Pa., he had drilled the then deepest cable tool well in the world—reaching a depth of 10,096 ft.

Barton No. 8 went down farther and farther as the months slid along. Chert or pay sand of the Oriskany family was encountered at 7145 ft in March 1948. Drilling continued on through that formation but no gas was found. Barton No. 8 was one of the few wells in the district south of Uniontown in which a pay formation was not tapped in the chert.

Since this well was on the highest known point of the subsurface dome, we decided to explore for the Clinton sand. There had been no Clinton exploration in this area.

We set our sights on the Clinton sand which should be about 10,500 ft below the surface at this point. Drilling continued through the summer of 1948. In November a depth of 10,312 ft was reached. This was the deepest well ever drilled with cable tools—but we had no gas!

At this depth the tools stuck. They were in a salt formation. We had encountered salt from 9288 to 9552 ft, from 9711 to 9750 ft, and from 10,250 to 10,312 ft. We fished for our stuck tools. In drilling past the tools, the bailer stuck in the hole. In trying to fish out the bailer the second string of tools was stuck.

The salt formation seemed to move in and hold the tools in a tight grip. At this point we had 851 ft of 10-in. steel casing in the hole, plus 2387 ft of 8¼-in., 7123 ft of 7-in., and 10,020 ft of 5½-in. casing. The severe difficulties we had been encountering in those weeks caused us to decide that further drilling was impossible and the well should be abandoned.

In order to salvage as much as was possible, the 5½-in. casing was finally cut off at 7700 ft and pulled out. This left about 2300 ft of the 5½-in. casing in the hole.

As we pulled this casing out—the well started to make gas!

In order to find out where it was coming from, we employed Schlumberger Well Surveying Corp. of Houston, Texas. As the gas entered the hole it expanded and was reduced in temperature. A thermometer, lowered down the hole, showed marked reductions in temperature at 7150 ft and 7228 ft. That was undoubtedly where the gas was entering the well.

We shot the well with nitroglycerine. This did not increase the flow. Dowell Inc. came on the job and injected hydrochloric acid into the pay formations in an attempt to boost the gas flow. This did not aid the production. Therefore, we decided to cease work on Barton No. 8. The well was filled back to a final total depth of 7241 ft. Connections were made to our adjacent lines.

Today, we have a flow of 214,000 cu ft per 24 hours and a rock pressure of 1650 lb per sq in. On July 22, 1949, the Barton No. 8 was considered completed. The books show that it represents an investment in our never-ending search for gas of about $160,000.

Why did we get gas "coming up" when we did not get it "going down?"

I do not think anyone will ever really know. A possible explanation is that water was standing on the pay formation in Barton No. 8 from October 1948 to March 1949. Some of this water covering the pay formation may have been absorbed. This might have caused an expansion of the sections in the formation. Cracks may have resulted. These could very easily have allowed the gas flow into the well as we pulled the 5½-in. casing out.

Gas Flame-Hardening Of Large Gears

By PAUL A. FURKERT

GAS AND AIR mixing machine, to supply uniform mixture under various gas consumptions.

If we were able to read a gas sales engineer's mind, as he approaches a plant where gears are made as parts of a complete machine, we would learn that he has prepared for himself two sales talks; one for the manufacturer using gas for hardening gears whose gas load is to be maintained or increased; the other for the manufacturer who does not harden his gears at all and who should be sold on heat treating with gas.

In this article, we will assume that the last mentioned case develops, and here we will take over the salesman's role. In this capacity we should not be afraid of some sales resistance; for an example, our prospect might tell us straight out that gear hardening (with gas) is too expensive for him. To meet this argument, we relate the true story about a manufacturer of a patented machine.

A certain manufacturer's sales were somewhat limited before World War II, but he was assured of a fair profit because of his patent protection. Changes in economic conditions after the war greatly stimulated his sales and income. To spread his profits over future, and possibly lean, years he decided to put out his machines on a long term rental basis, instead of making outright sales. He now had to meet an even greater demand for his product, for prospective users had ready cash. He enlarged his manufacturing facilities; and now a real problem has developed. His rental contracts stipulated that he must maintain the machines in good operating condition at all times. However, because renters generally work the machines much harder than do owners, the gears wore out very rapidly. Idle machines do not produce revenue; labor and traveling expenses for repairmen mounted, as did the cost of replacing gears. To stay in business this manufacturer had to harden his gears.

We end our true story here; our prospect apparently found food for thought in what we said. He asked us, "What is the cost of hardening large gears, and can I harden those which I now have on hand?" We replied that their 28-in. diameter gears with 5-in. face, made of low carbon or inexpensive steel, could be hardened only by first carburizing and then hardening. However, there is one drawback. Gears of such size would most likely warp in this heat treating process to such an extent that they would become worthless. The cost of hardening such a gear, assuming its weight to be about 350 lb, would be approximately $35 each.

We now cite the case history of how the Goodman Manufacturing Co., Chicago, foremost manufacturer of mining machinery, solved a similar problem involving a gear for a new machine. Like most concerns of such calibre, Goodman has access to the best sources of raw material, and the latest manufacturing processes. It was found that gear blanks of the correct size, made of 1040 steel, which is hardenable without carburizing, could be purchased as a stock item from one of the larger steel companies.

The blanks are completely machined in the usual manner, and are then ready for hardening. All available heat treating methods were thoroughly investigated by Mr. Dickter, chief metallurgist of the Goodman company. Aside from the fact that the gears had to be hardened with the minimum amount of distortion, long wearing quality and resistance to shock were the desired end results.

Other Available Means

Before the method by which Goodman gears are now successfully flame-hardened is described, mention should be made of other available means, without prejudice as to the merits.

Electronic heating means have been widely advertised in connection with gear heat treating.

The use of high temperature gases, for instance, acetylene and oxygen, is advocated by the manufacturers of these products.

Both heating means have their place in the art of localized heating. The industrial gas engineer should study such methods carefully. He will then

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The author is a metallurgist with Gas Appliance Service Inc., Chicago. This article was originally presented at the AGA sales conference on industrial and commercial gas, Nashville, Tenn., April 5-7. It has been expanded expressly for publication in *GAS*.

discover that his fuel—natural, manufactured or mixed gas—is best fitted for certain flame hardening applications, and he should direct his sales efforts accordingly.

The gas industries should cooperate with development engineers and metallurgists to redesign certain types of gears so that most reasonably priced fuel, industrial gas, can be more widely used in this field.

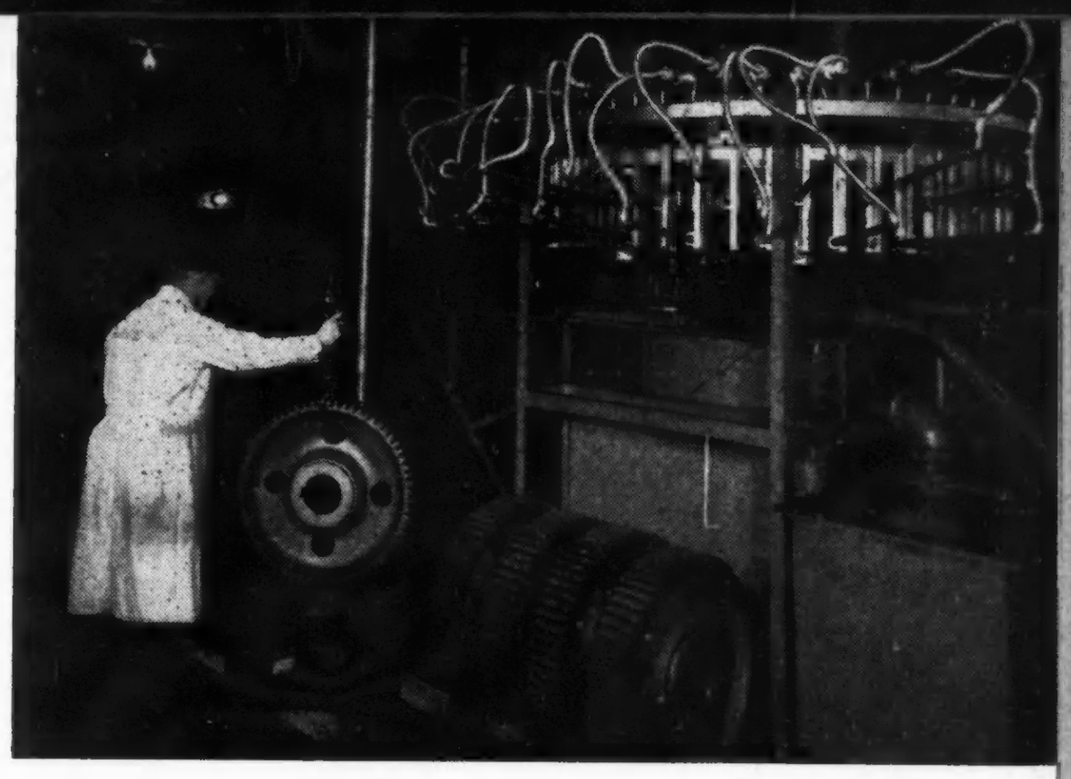
Goodman Manufacturing Co. hardens its 28-in. gears by spinning them within a cluster of high velocity burners, supplied with a complete mixture of gas and air. *Figs. 2* and *4* show the equipment which is being used, being installed in the gear hardening department of Gas Appliance Service Inc. of Chicago, where the work in question is performed.

The theory of localized heating or flame hardening necessitates the utilization of the highest flame temperature which combustion of gas with air is capable of producing. It also requires that the surface or part to be hardened be subjected to a stream of such high temperature gases under the greatest possible velocity.

A gas and air mixing machine such as shown in *Fig. 4* is the best means of supplying a uniform mixture under various gas consumptions.

Naturally various amounts of gas-air mixture and different numbers of burners are used for larger or smaller gears.

High velocity gas burners require good flame retention means. Gas Appliance Service Inc. has a patent application pending on a burner which is made in two sizes, the large one of which is shown in *Fig. 2*. These burners have built into the burner mouth, or outlet, a unique piloting means. Further flame retention and combustion are achieved through a zig zag passage of a refractory tunnel, from which the burner derives its trade name—"Zig-Zag."



HIGH-VELOCITY gas burner at right was designed for good flame retention in hardening large gears.

A total cycle of pre-heating, soaking, final heating, time quenching, and flame drawing requires 10 minutes per gear. A maximum gas consumption rate of 3 Mcf of 800-Btu gas per hour is reached during the two-minute period of the high heating cycle, but the total cost of gas consumed is only 50 cents per gear, assuming a rate of 10 cents per therm. Labor cost at $1.50 per hour would add 25 cents per gear for a total primary cost of 75 cents for labor and fuel, which is less than one-fourth of one cent per pound of steel treated—a very low figure.

Other Charges

To the 75 cents must be added the setting-up charges, costs of supervision, handling and loading, testing and other overhead expenses, which are applicable to all methods of heat treating.

It seems that industrial gas will play an important role in the art of flame hardening on account of its low cost.

To harden gears without any distortion at all is practically impossible, and therefore some gears must be finish ground after hardening so that they will run quietly at high speeds.

Anyone who has seen a flame-hardening operation will have noticed that only one gear is being heated at a time, but there is no sound reason why we should not be able to produce setups to harden four or five gears at one time with gas and air. It must be kept in mind that gas users are very seldom, if ever, burdened with a demand charge. Therefore, we can have high-Btu releases over short periods of time without penalty as to unit cost.

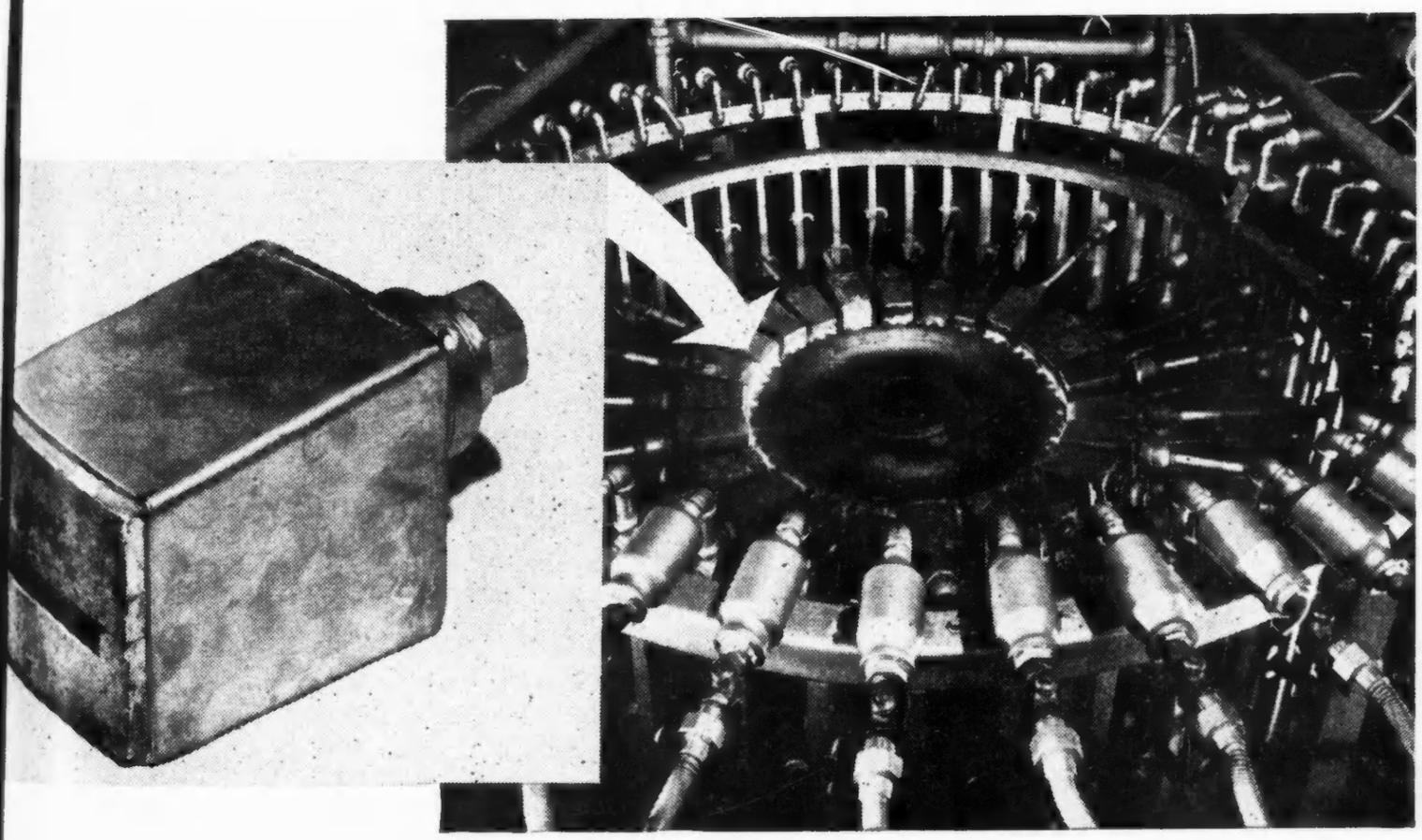
Furthermore, we do not encounter the type of insurance regulations which becomes more serious for the user of bottled gases, such as acetylene, oxygen or propane, as he increases the number of tanks on one manifold to meet high demand rates.

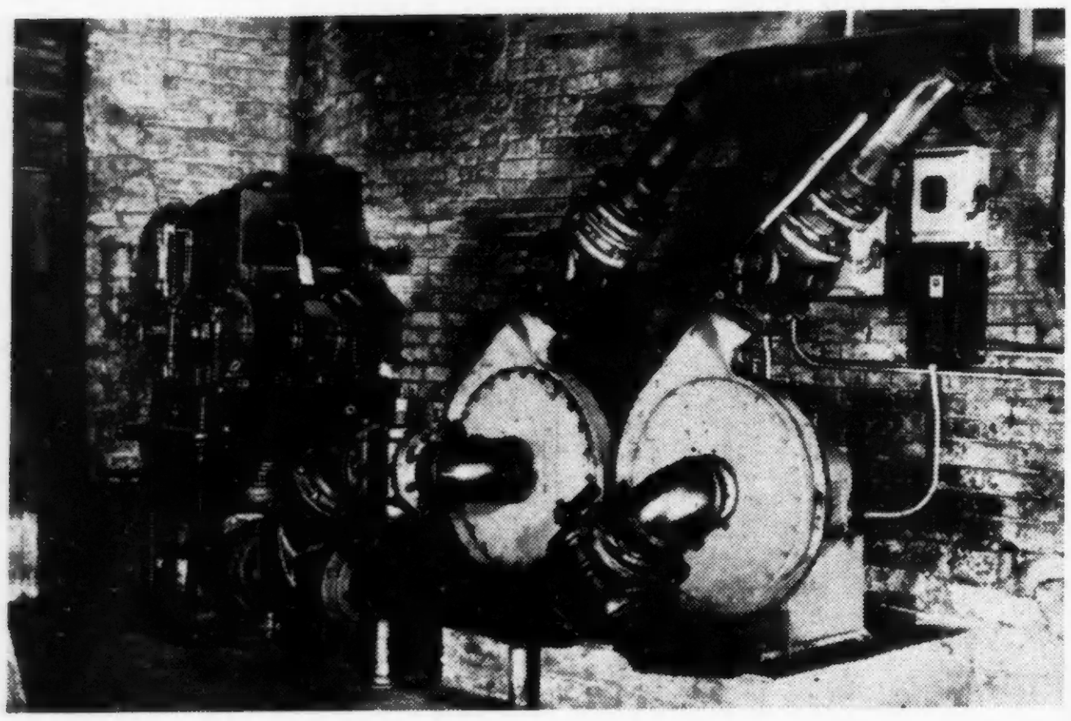
The question of hardness pattern should be touched upon. It is still a very controversial subject among metallurgists. However, it can be stated that wear and shock resistance or tooth strength only require definite hardness patterns. How to obtain these with various tooth cross sections is still to be explored by the research engineer.

The industrial gas engineer can perform a real service to the metal industry in general by bringing the cost of flame hardening equipment within the reach of the average machine shop.

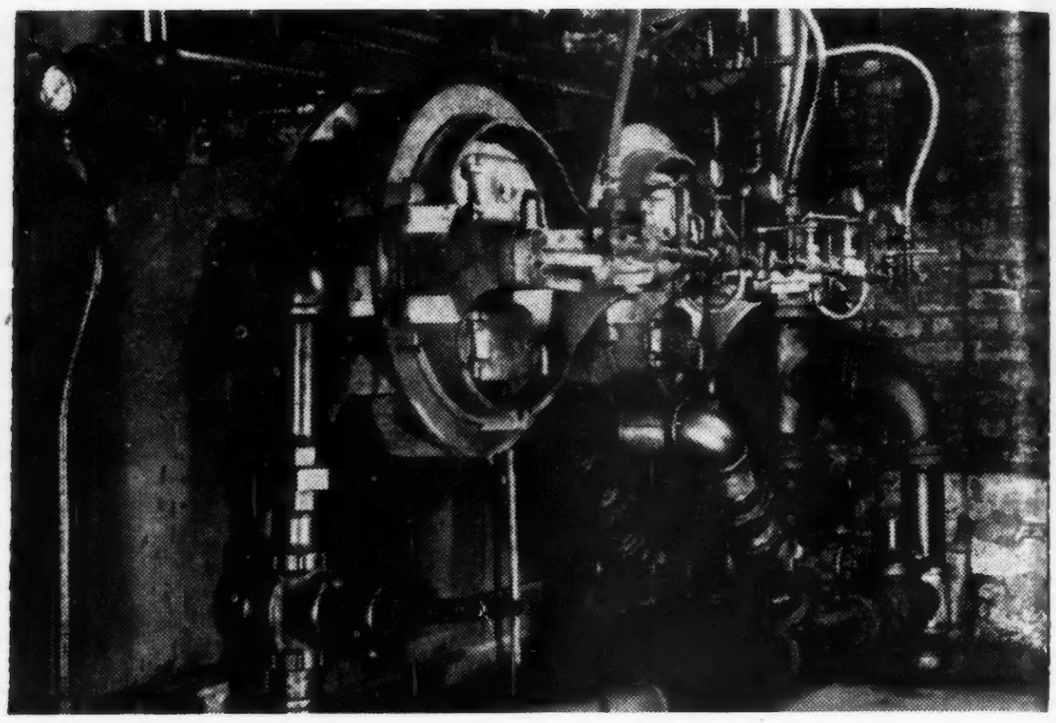
Ordinarily, machine tools such as lathes, milling machines, and drill presses can function conveniently as flame hardening machines if provided with certain attachments such as demountable burners and quench tanks. For example, take the radial drill. If a burner arrangement were attached to its main post and a quench tank placed on its table, the machine would be ready for flame hardening gears. Further, it should be remembered that the first successful experiments with gas and air flame hardening were made on a milling machine equipped as mentioned.

FLAME-HARDENING a large spur gear with gas and air, using a zig-zag burner. Gear is 28-in. OD x 5-in. face, used in electric locomotives.





AT LEFT are shown twin gas boosters which raise gas pressure from 4 oz to 2 lb at Atlantic Brewery Co. BELOW are shown two oil-gas burners installed behind the 225-hp boilers at the Atlantic plant.



"Old timers get together"

Gas Does Its Part for Thirsty Chicagoan

THE art of making beer dates back at least to ancient Babylonian days, while it is a matter of historical record that the oldest known use of gas was for the evaporation of moisture from salt in China several thousand years ago.

Exclusive

It is only in recent years, however, that beer and gas—two old timers—have gotten together on a large scale. There are eighteen breweries operating within the city limits of Chicago and seven of them are enjoying the use of gas during six months of the year (April 16 to Oct. 15) for water heating and steam generation.

Consumption

During the summer of 1948, these seven breweries used a total consumption of 4,358,030 therms or 544,753,750 cu ft of 800-Btu gas. This is more gas than the average American city with a population of 50,000 uses during an entire year for all purposes.

The following tabulation shows just how this amount of gas (in therms) was distributed among the Chicago breweries:

Ambrosia Brewing Co.	350,520
Atlantic Brewing Co.	400,824
Atlas Brewing Co.	1,608,948
Best Brewing Co.	455,052
Garden City Brewery	279,860
Peter Hand Brewery	821,306
Monarch Brewing Co.	441,520
Total	4,358,030

From the standpoint of the gas company, this is a desirable load to have on the lines, as it comes on at a time of the year when there is usually plenty of gas available. On the other hand, the use of gas at present fuel prices means a considerable saving in fuel costs for the brewery, not to mention the many other attractive features inherent in gas.

When using gas, it is also possible for the brewery chief engineer in preparing his budget in advance to determine fairly accurately just what his fuel costs are going to be for the six-month summer use. This is due to the fact that the price of gas has remained steady with little or no change over the years.

Table 1 shows the comparative fuel costs at present price levels during the summer months for generating 1000 lb of steam. These are bare fuel costs only and do not take into consideration any handling and other charges incidental to their use.

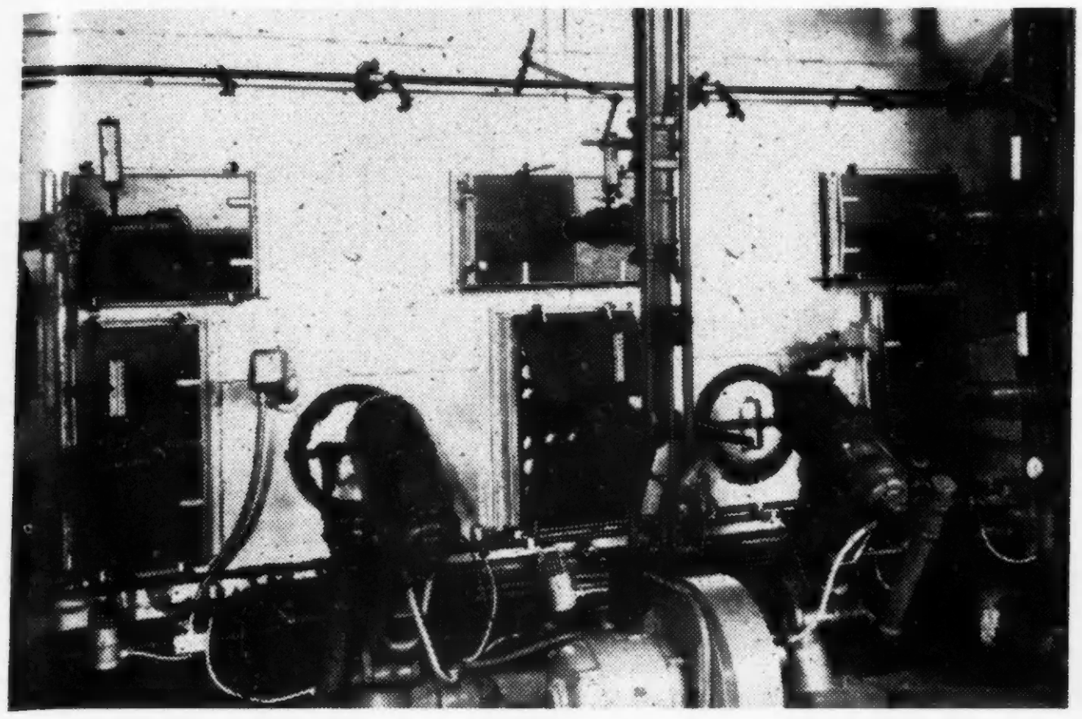
Most of the boilers used in the Chicago breweries are of the water tube brick set type. Brick set boilers usually have walls 18 to 27 in. thick of either the insulated or uninsulated type. Some of the newer boilers are equipped with air-cooled side walls through which all or part of the combustion air passes before entering the furnace. The air flowing through the hollow walls cools the refractories, reduces radiation loss and picks up heat which is returned to the furnace. Large boilers designed to operate at high ratings are often equipped with water cooled walls to reduce refractory maintenance and slag adhesions.

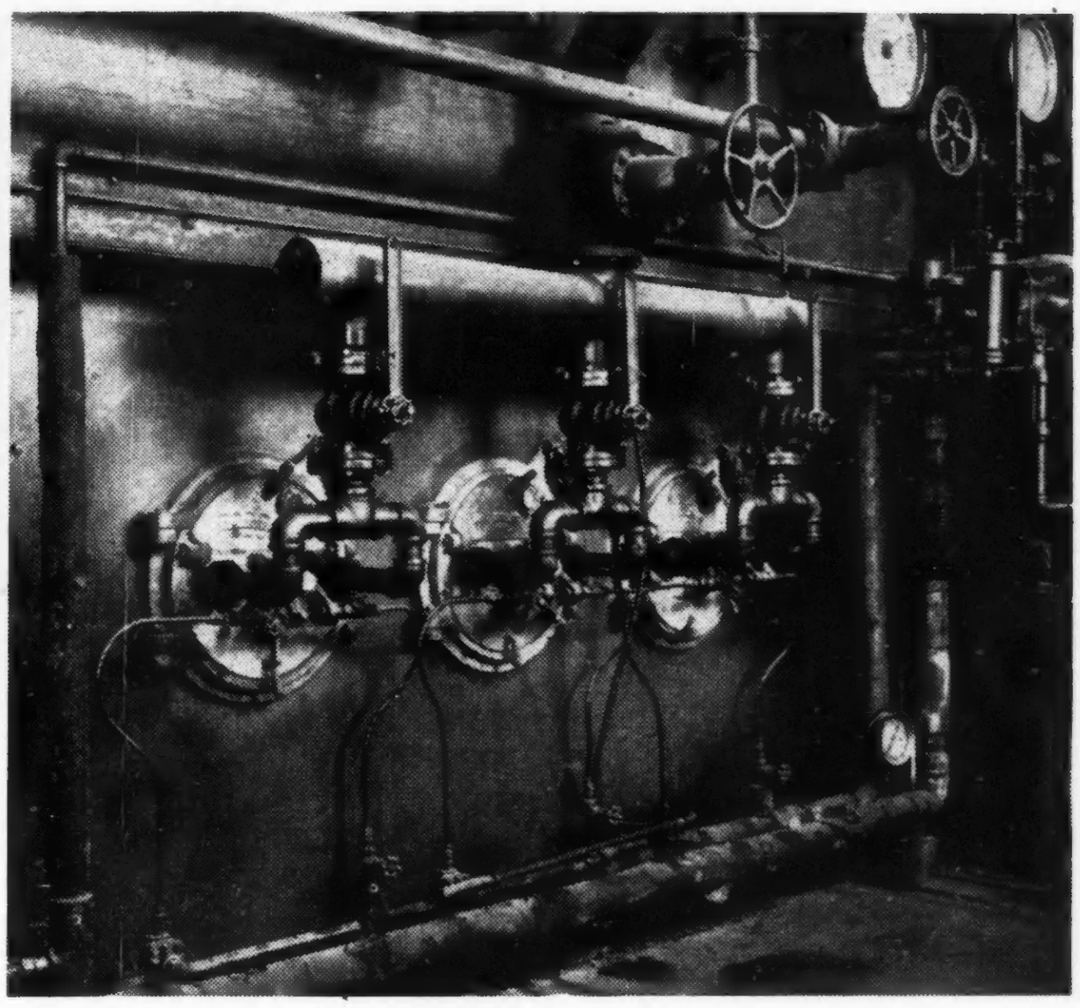
Ordinarily, brick-set boilers do not present serious problems in converting to gas fuel. Most types of gas burners can be applied and will be found to operate satisfactorily. The hot refractory is an aid to combustion and with ample flame travel no difficulty will be

TABLE 1. COMPARATIVE FUEL COSTS FOR GENERATING 1000 LB OF STEAM

Fuel	Amount Required	Cost per Unit	Fuel Cost per 100 lb Steam
Gas	14.5 therms*	$ .0225/therm	$ .33
Coal**	142 lb.	$8.00/ton	$ .57
Oil	9.7 gal.	$0.10/gal.	$ .97

* One therm equals 100,000 Btu
** 12,000 Btu/lb 60% efficiency overall
Gas and oil computed at 70% efficiency overall





ABOVE is the oil-gas installation on a 350-hp Babcock-Wilcox boiler with Williams Bros. & Miller burners. Locale is Garden City Brewery. AT RIGHT are Todd burners on two Page-Burton four-drum cross-tube forced draft 600-hp boilers at Atlas.

By WILLIAM HELME

encountered in completing combustion before the cold surfaces of the boiler are reached.

Many types of stokers are encountered when converting from coal to gas. Usually they are removed for gas fuel; occasionally, however, a job will be found where for some reason it appears advisable to leave the stoker in place. If this is done it is necessary to protect the stoker by covering it with 2½ in. of insulating brick and 5 in. of fire clay brick. To stop air infiltration through cracks in the brick work, the grate should be covered with ¼-in. asbestos paper before laying the brick. Chain grate stokers protected in this manner have given no trouble when the boiler was converted back to coal after six months' operation on gas.

Type of Burners

All gas burners used in the Chicago breweries are of the nozzle-mixing type, usually designed by Todd or Williams Bros & Miller. These in turn are divided into two other classes, the multitube and the register type.

The multitube gas burner consists of a series of small refractory tubes, which may be molded in single or in multiple units, each of which constitutes a gas burner, through which gas and air for combustion enter the furnace. These tubes assume many different shapes to suit the whims of the designer. Some are circular, some rectangular, others elliptical, and some are shaped like an equal-legged cross. Air for combustion under the action of the stack draft or under pressure from a fan is forced through these burner tubes. Gas under pressure is admitted into each air stream by means of a centrally located jet with one or more orifices.

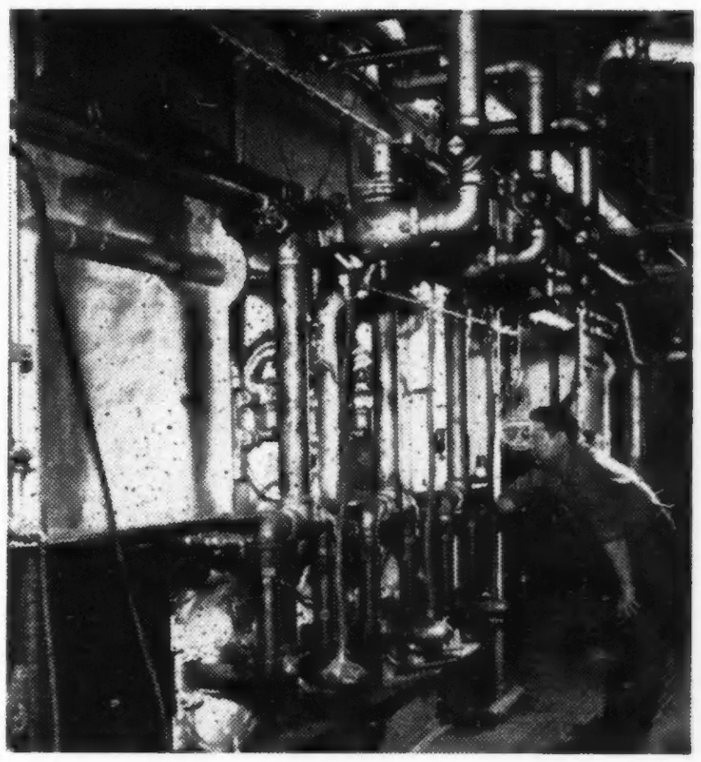
Multitube burners are essentially low pressure burners and operate best at gas pressures between 2 oz. and 1 lb. At pressures less than 2 oz. the velocities of the incoming air and gas are too low to assure complete mixing, and satisfactory flue gas analyses are difficult to obtain.

Since most of these burners are operated on natural draft, it is essential that ample fire box draft be available during the summer if operation at full capacity is necessary. The draft losses across the different makes of burners vary somewhat. Most manufacturers specify a maximum draft of .25 to .30 in. of water column in the combustion chamber to develop the full capacity of the burners.

Register type burners usually consist of a large fire clay tuyere block varying from 10 in. to 24 in. in diameter, through which the combustion air passes into the furnace. Attached to the front of the tuyere block is an air register provided with vanes to control the air flow and in some cases to give the air a rotary whirling motion to increase turbulence as it passes through the burner. Gas is introduced into the air stream usually through a hollow ring manifold, having a diameter equal to that of the air port, which is drilled on the inside at an angle to admit the gas.

Instead of having a ring through which the air passes, some burners have a smaller streamline ring directly in the air stream drilled with holes at an angle on both the inside and outside of the ring. Other burners use a central tube, the nose of which is drilled at an angle, through which the gas is introduced.

Register type burners are readily converted to oil fuel by placing an oil burner of either the mechanical or steam atomizing type in the center. Burners of this type are essentially high pressure burners and operate best at gas pressures above eight ounces. Below that pressure some difficulty may be experienced in maintaining a satisfactory flue gas analysis as the velocity of the gas stream is too low to penetrate the air stream and assure proper mixing.



Monarch Brewery fireman checks gauges on 360-hp Lasker boiler with Todd burners.

Process steam for brewing must meet exacting demands. The success of the brew depends largely on a steady supply of heat in the large brewing kettles. Similarly, large volumes of steam at close temperature control are required for pasteurizing and bottle washing.

Chicago breweries have found gas an ideal fuel for summer use on these various processes and thus two old timers long separated are finally working hand in hand to mutual advantage.

A portion of this article originally appeared in *Gas News*, employee publication of Peoples Gas Light & Coke Co., Chicago. The author is a member of that company's public relations department.

GIANT GAS-FIRED KILNS LABOR FOR PERMANENTE

PERMANENTE Cement Co., until recently the world's largest cement producer, is in a highly competitive industry, where profits are figured in overhead cost efficiency. A major need is a good, inexpensive fuel—and filling that need is gas, of which 19 MMcf daily flows into Permanente's four roaring kilns.

Exclusive

These four 450-ft mammoths, which reduce limestone to cement clinker, measure 12 ft in diameter, and produce 16,000 bbl—or 64,000 sacks—of cement during a 24-hr work day. Last year's production topped 22 million sacks.

Permanente is located in the Los Altos, Calif., limestone hills, where a 30-year supply of cement ingredients lies buried.

Permanente gets its gas through 12-in. PG&E mains from the Rio Vista field—sometimes as far as Coalinga, Calif., and the Kettleman field. From its metering station, the main goes directly beneath the giant kilns—which look like huge rotating pipes to pressure reduction diaphragms.

From reduction diaphragms the natural gas flows to huge Coen burners, through a 20-in. burner pipe which acts not only as a gas and primary air inlet, but also as a fuel oil source for emergencies.

Pressure of 18-20 psi is maintained at the burners, each burner firing some 4 MMcf daily.

The Coen burner, which extends into the giant kiln some 5 ft, is a complicated orifice-within-an-orifice arrangement. The outside pipe is 20 in. in diameter, but the actual gas pipe is but 5 in. in diameter. An additional baffle reduces the orifice opening to 7 sq in. The remaining area of the 20-in. pipe is used for forced primary air fans, which propel the flame into the 450-ft kiln. Another giant fan at the farthest end sucks the flame into the kiln, adding the input fan.

Since the burner normally operates at 18 psi, the orifice's 7 sq in. gives volume capacity needed. Actually the flame runs but 50 ft of the kiln's length, at 2800° F, normal operating temperature at the tip.

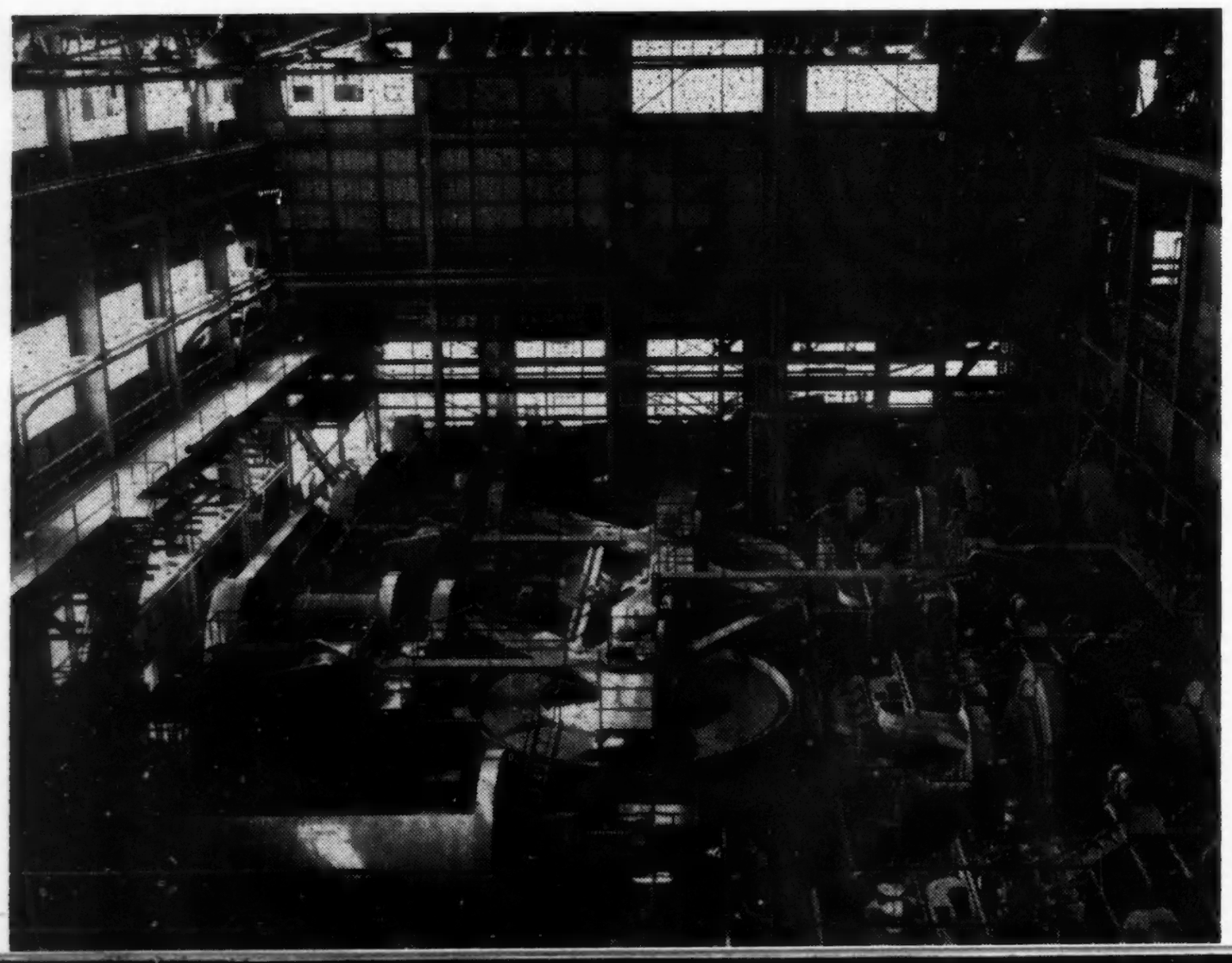
A center pipe, for oil, is standy equipment. While oil, which burns under 400 psi, admittedly burns hotter, it isn't as easy to handle and has to be hauled in by tank or truck.

Permanente is digging deeper into its 50 million tons of limestone reserve, figures it has 10 years of high-grade ore, 25 years of low grade. By judiciously mixing the high with low, it estimates another 25 years of operations.

Forty-eight-inch conveyor belts move limestone from quarry to stockpiles. A huge 5-yard shovel loads 25-ton buggies with 1.5 million tons of limestone yearly for transfer to jaw crushers where boulders as large as 6 ft are crushed to 6-in. maximum diameter.

Limestone is dug out, pulverized, mixed with clay, and burned in the kilns to clinker. Then gypsum is added for setting, the clinker is ground up, and you've got cement.

INTERIOR OF THE MILL building, where clinker is crushed to powder.

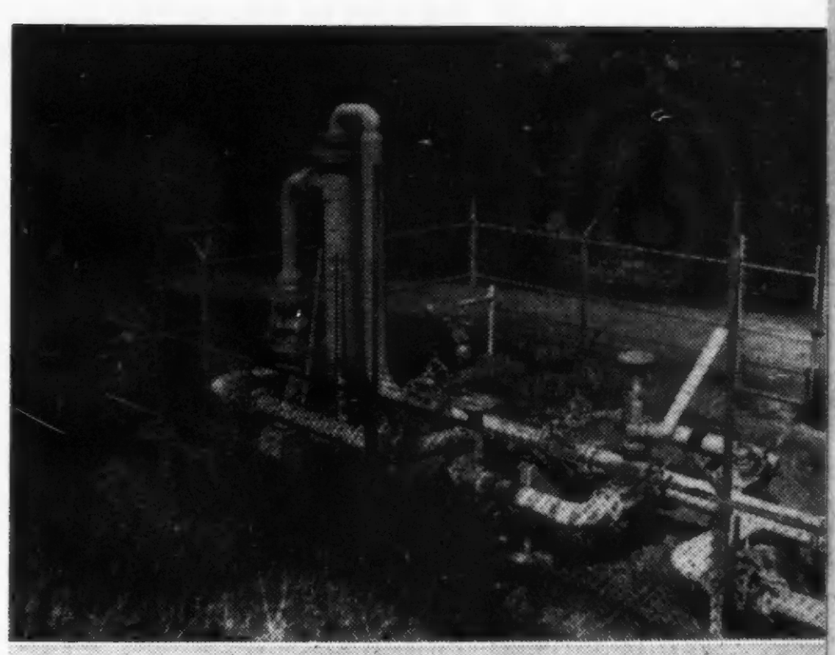


Plant Follows Contract

Permanente's establishment was a milestone in government contracts—and showed the nation's faith in Henry J. Kaiser, who was awarded a 6.8 million barrel cement contract for the $360 million Shasta Dam before he'd even started to build his cement plant! The government's faith in Kaiser was rewarded when Permanente mushroomed up in seven months after its beginning in June, 1939, and was delivering cement to Shasta two months ahead of schedule. Permanente received its name from an ever-flowing stream on plant property—a stream known to the Spaniards.

There are two types of cement plants, wet and dry. Permanente operates wet. Wet slurry, which is powdered limestone mixed with water—61% solids, 39% water—is fed into the kilns, after raw clay is added. This mixture is almost completely liquid. It flows down a feeder pipe in the far end of the kiln, away from the fire end, through a 4-ft opening. The kiln, which slopes at a rate of ½-in. to the foot, rotates continuously, and can be regulated to turn within a range of 30 to 70 revolutions per hour. A negative draft provided by induction fans in the inlet end helps to pull the distant wall of fire into the length of the kiln, thus insuring clinker formations—which is the end result of kiln-burning.

AIR VIEW of Permanente cement plant shows the size of the four cylindrical kilns. Stack and building in right background comprise the dust-collecting system, directly above stack are conveyors, which carry limestone from quarry to stockpiles. Largest building houses mill; to the left of the far end of kilns is the crusher building. Large thickener tanks are at left.



GAS METERING station for the Permanente plant.

FOUR CYLINDRICAL kilns are seen, with camera looking toward stockpile.

VIEW OF THE KILN firing section, at right, into which gas flows through the 20-in. pipe.

As the slurry moves slowly down the rotating, sloping kiln, it begins to dry and become plastic. Next it encounters a 65-ft chain section. Twenty circles of 5/8-in. chains, 15 ft long, hang screw-like in the kiln, turning and twisting with the kiln's 1-rpm rotation. The 65-ft chain section is a heat interchanger. The chains, heated by hot blasts of flame and air, stir the slurry, drying it. Chain motion tends to sluff off dried portions, break drying parts up, and clean off the kiln wall all in one operation. As the slurry moves down the kiln, still in the chain section, it turns plastic, becoming 80% solid, 20% water. Slowly the chains and kiln rotation moves the drying plastic forward. At the end of the chain section the slurry —now plastic—has become 95% solid, with only 5% moisture remaining.

Most of the remaining length of the kiln is devoted to calcining action—an oxide-forming process brought on by heating the plastic to near liquid. During calciner action, no clinker is formed. Main purpose of long kilns is to calcine to 100% exhaustion of the limestone, driving out all the CO_2.

The final result — clinker — comes after calcining, and is produced in a relatively small section of the kiln, at the extreme heat center of the flame. This is the clinker formation area—also called the firing zone—where a cement conversion is formed of calcium oxide, converted into a silicate by the combining of CAO and silica. The resulting clinker falls into coolers beneath the firing zone, and after 3% gypsum is added to control setting time, is pulverized to fine powder cement in finish mills, utilizing ball grinders. The result: Cement.

The Cottrell dust collecting system recovers feed dust from kiln gases equivalent to 175,000 bbls of cement annually—and is 99 9/10% efficient—only burned gases and steam emerge from the stack.

Most spectacular kiln zone is the firing section—directly in line of fire from the tip—and operating at 2800°F. Sighting ports in the kiln fire door allow inspection through colored glass, and show an inferno of fire, like a giant volcano in eruption—tumbling, turning, spewing semi-liquid clinker and burning, erupting gases. Three components of the chemical inferno are the burning gas, the glow of the clinker in semi-liquid state, and actual heat given up by the clinker. An added draft, fanned by induction at the back end of the kiln, whips the inferno into an even greater spectacle.

Firing Kilns

Each kiln produces 2.75 bbls—11 sacks—of clinker a minute, uses 3300 cfm of natural gas in the process. Each kiln during a 24-hr run turns out 4000 bbls—16,000 sacks—of clinker.

Firing kilns is a specialized job. One mistake and the kiln's interior is ruined. Relining is one of the most expensive operations in the industry. Nine inches of chrome magnesite fire brick protects burning zone walls, and is produced by Kaiser's refractory plant at Moss Landing, near Santa Cruz, Calif. Chrome magnesite bricks can withstand temperatures to 3000°F.

Natural gas from the metering plant comes to the kiln pressure regulators via 14-in. pipes, and is lowered to the 18-psi tip pressure by successive diaphragms, each dropping the pressure some 10 psi.

Permanente gas experts start with the desired tip pressure 18 to 20 lb, work backwards through diaphragms to gas intake. The higher the pressure at valves, the greater the sensitivity—and the quicker the control action. At 20 psi valves are reasonably sensitive.

Burning day and night, in a continuous operating schedule, are Permanente's huge kilns—possibly the biggest single gas users in the West.

Exclusive

Pinpointing Technical Data Is Company Library's Job

By ROMAN L. PIJANOWSKI

RECORD-BREAKING volumes of business, traceable to the war's impetus and the rising costs of competitive fuels, have brought headaches as well as smiles to The Peoples Natural Gas Co. The company's overall growth has caused expansion in most departments—and has created a special company library, to organize and coordinate into an accessible and workable reference tool the almost countless technical and business bulletins and magazines received in the mail each year.

Special Purposes

A special library distinguishes itself from a general or public library in that it serves a special organization through a special collection, using special methods. Its keynote is service. Its functions vary according to the type of organization it serves. Generally the functions of our library are these:

1. To make available to all personnel any books, pamphlets, magazines, journals, or news services which will supply needed information.

2. To study magazines, journals, trade publications, and call interested parties' attention to pertinent material.

3. To circulate current publications by the routing-slip method, having the last reader return the publication to the library.

4. To clip articles which might be of interest for future reference and file them in a classified vertical file.

5. To circulate periodically among personnel a biblography and/or abstract of new books which will have been added to the library.

6. To order any requested publication and keep account of magazine subscriptions.

7. To answer questions on request. This will involve anywhere from a few minutes to a few days research.

8. To represent and present the company in the best possible light in its relations with other companies, libraries and individuals.

The Peoples Natural Gas Co. is a member of the Special Libraries Assn., a national organization represented by a local chapter.

Library Content

At present our library contains 831 volumes including both general and special reference books. The general references are Encyclopaedia Britannica, Nelson's Encyclopaedia, Poor's Register of Directors and Executives, Hotel Redbook Directory, Roget's Thesaurus, petroleum and gas directories, and local business directories. The special collection consists of geological chemistry and physics texts of gas and petroleum, history and technology of the gas and petroleum industry and various statistical services.

Our books are classified according to the Dewey Decimal system, which is the most widely used system in the United States. Its greatest virtue lies in its facility to classify all knowledge, known and still to be known, ad infinitum. Its expansion is unlimited because of the arithmetical ability of digits to continue without end to the right of the decimal point.

The periodicals number 110 and are by far the most widely used references in the library. In addition to the well-known oil and gas magazines we receive, it might be well to mention a few publications pertaining to other industries such as *Iron Age*, *Coal Age*, and *Electrical Merchandising*, to which we also subscribe. We receive the *Chicago Journal of Commerce* and the *Wall Street Journal* which are kept for a few months and then discarded. The three local newspapers subscribed to are kept for one month.

Use of Space

The periodicals are arranged in the stacks according to alphabetical sequence. Each year the most important magazines are bound for permanent housing while those of merely temporary value are destroyed. This procedure must be followed in order to conserve valuable space.

The periodicals are indexed by The Industrial Arts Index—a subject index to a selected list of engineering, trade and business periodicals. This indispensable library tool is published by The H. W. Wilson Co. of New York.

"THIS IS NOT INTENDED to be a lengthy paper discussing library operation," says Mr. Pijanowski, who is librarian for The Peoples Natural Gas Co., Pittsburgh. "It was written as a suggestion to the gas industry that a company library might help coordinate and disseminate needed information."

The manner in which a company library is to be set up is dictated by the size of the company and its needs. Peoples has a small one, staffed by only two full-time persons. Maintenance of files of periodicals cannot be fixed, but has to be carried out in accordance with available space versus need. Being in the gas industry, Peoples binds and keeps in permanent files the several magazines devoted chiefly to the problems of utilities, but discards other periodicals after one or two years. Organization of routing systems is always a tough problem, because of the human element; according to Mr. Pijanowski, the only effective method of pushing stalled periodicals back into circulation is by telephone requests.

Mr. Pijanowski recommends that companies intending to set up a firm library consult the local chapter of the Special Libraries Assn., 31 E. 10th St., New York 3. A recent pamphlet titled "A Brief for Corporation Libraries: A Guide to Their Operation and Management" is available from the association. Its suggestions on organization and administration, routines, and services are particularly good.

Replaceable Hood Assembly

Replaceable Reset Assembly

Aluminum Alloy Body

Safe Lighting

BASO

the Automatic

SAFETY PILOT

100% SHUT-OFF

It's new . . . it's Baso . . . this Model 814 valve! In addition to that famous Baso automatic safeguard—the 100% shut-off—it has all the rugged reliability that corrosion-resistant aluminum and stainless steel parts and modern scientific design ensure. Use it . . . let its many genuinely advanced features give added advantages to your central heating appliances, booster water heaters, conversion burners, unit heaters and other applications up to ¾-in. pipe size.

WRITE FOR BULLETIN SC-300-35

MILWAUKEE GAS SPECIALTY CO.
MILWAUKEE 1, WISCONSIN

The library is located on the seventh floor of The Peoples Gas building, occupying two rooms with a combined floor space of 674.72 sq ft. The smaller of the two rooms has been comfortably furnished with a patternless, Burgundy-colored rug, a large centrally placed reading table seating eight persons, three triangularly spaced leather upholstered club chairs, each flanked by an adequate three-way reading lamp and a standing brass ashtray. Against the east wall are four glass-enclosed wooden bookcases containing an especially valuable collection of geological books now long out of print. Against the north wall stands a large, wooden, air-tight cabinet housing motion picture projector equipment and films.

Equipment Needed

The larger room contains 21 green metal bookstacks arranged in library aisle fashion, three legal size filing cabinets. a typist desk, regular office desk, one table, and three chairs.

At present the space allotted to the library is adequate and should be for the next five years. However, it is well to remember what Dr. J. Metschl, director of the Gulf Oil library at Harmarville, Pa., says, pertaining to library size: "A special library doubles its size every 17 years during normal times and sooner during this post-war period."

The vertical files hold pamphlets, technological articles, pipeline maps, photographs, annual statements, news services, statistical material and various oil and gas industry releases. This material occupies 12 legal size filing drawers and is classified on a modification of the Dewey Decimal system called the Uren Decimal system for the oil industry.

Clippings Filed

Clippings culled by the promotion section of the sales department from 68 newspapers in the Peoples territory are kept in large albums and filed according to years by the library.

The film library also comes under the jurisdiction of the librarian, who is responsible for the housing of films and projector equipment and their maintenance. He has also been delegated by management to act as projectionist, and, frequently, speaker when screening pictures for both our company employees and various fraternal and social organizations in Pittsburgh and other towns and cities in Peoples territory. One of the screening projects was the showing of the Bell Telephone Co. film "Telephone Courtesy" to 900 Peoples employees, mainly office and public contact personnel.

CHANGEOVER PROBLEM

Adapting Lab Burners for Natural Gas

The flame characteristics of natural gas are so different from those of manufactured fuel gases that a change in gas supply from manufactured to natural gas necessitates the alteration of practically all gas-burning appliances. The different requirements of Bunsen and similar types of laboratory burners when they are used with natural gas have usually been overlooked by manufacturers. Even those burners advertised as designed for natural gas have not proved satisfactory.

As a result of this difficulty the National Bureau of Standards secured and tested 16 different laboratory-type Bunsen burners, eight of which were of the Meker type and eight straight tube burners. The limits of operation of each of these burners, sold as suitable for natural gas, were determined. By a correlation of these data with the basic requirements for good burner design, the reasons for the poor showing on natural gas and the changes required for satisfactory operation were found.[1]

A survey of the various heating operations for which a laboratory burner is used indicated that the Meker-type burner should be capable of producing a hot stable flame at gas rates up to 10,000 Btu per hour, and the straight tube burners should be usable at rates up to 5000 Btu per hour. The average maximum usable rate for the Meker burners tested was only 6363 Btu per hour, while that for the straight tube burners was 2781 Btu per hour.

A comparison of the dimensions of the 16 burners with the fundamental relations for good burner operation brought out three major reasons for their unsatisfactory performance on natural gas.

(1) *Too small port area.* A Meker burner should have at least 1 sq in. of free port area in order to deliver as much as 10,000 Btu per hour; only two of the eight Meker burners examined had ports as large as 1 sq in. From the results obtained on the straight tube burners a port area of at least 0.15 sq in. should be provided if rates up to 5000 Btu per hour are desired. Only one of the straight tube burners had a port as large as 0.15 sq in.

(2) *Improper throat size.* Results both from this study and those conducted by other investigators show the need of a throat with an area equal to 40% of the port area if optimum air entrainment is to be obtained. Most of the burners were unable to inject enough air to give a satisfactory flame with an orifice of adequate capacity. Only three of the Meker burners had throats close enough to the 40% requirement to approach optimum conditions.

(3) *Insufficient primary air opening.* Results showed a need for an air opening equal to at least 2.25 times the port area in order to insure sufficient primary air. A burner may be designed with a large enough port area and the proper venturi throat to inject a high percentage of primary air but may be prevented from doing so because of too small an opening for the air to enter the mixing tube. Of the 16 burners only five had a ratio of air-shutter opening to port area as large as 2.25.

Orifice Sizing

In addition to these three factors, use of the proper orifice size is equally important. The orifice size should be such as to give the maximum desired gas rate when used in its wide open position, and the needle should be used only to reduce the rate below this maximum.

Fortunately, most of the changes required in these burners are not difficult to make. Two burners, one a straight tube and the other a Meker type, were modified in bureau shops so that they complied with the requirements outlined above. These burners were then retested and found to be greatly improved. The Meker burner gave a hot, stable flame at all rates up to 10,000 Btu per hour and the straight tube burner could be satisfactorily used at rates up to 5000 Btu per hour. The modified Meker burner was also used for a number of laboratory heating applications which required intense heat, for example, sodium carbonate fusion. It performed all of these operations satisfactorily.

The results, together with a demonstration of redesigned burners, were presented recently to a group of interested manufacturers. As a result of this meeting several manufacturers are redesigning their burners.

[1]For further technical details see "A Study of Laboratory Bunsen Burners for Natural Gas," by John H. Eiseman, J. Res. NBS 42, 541 (1949) RP1991.

Milwaukee Clears Services With 'Vacuum Cleaner'

1. Service man tests pressure with appliances off and on, with manometer to determine whether house service needs cleaning. If appliance use causes pressure drop, trouble lies between street and house.

2. After pressure tests, truck-mounted compressor is called into action. Worker posts flag to warn pedestrians of hose on sidewalk. In background, gas is shut off at stop box.

3. "The snake" and "the doodle-bug" are used to remove rust from service pipe. The snake is a flexible cable with a cutting device; doodle-bug turns it.

4. Aspirator type of service cleaning calls for two hose lines: one to draw out rust and the other to draw out gas.

5. When pressure drop is slight, meaning clogging is slight, small industrial vacuum device is used. Note worker carrying tank of high pressure gas into house, to be used in blowing out rust and scale.

6. Final checks of all lines, purging lines of air, and testing of pilots and burners follows the service pipe-cleaning. One last check of pressure with manometer is made to test job's success.

WHEN steel or iron pipe has been underground 90 years—or even 25—rust and deterioration take their toll. This has been found to be true in the older sections of Milwaukee, and the Milwaukee Gas Light Co. has met the problem with specially trained men and special equipment to remove rust accumulations from street to house and from meter to appliance.

Tests by the company had revealed instances where rust and scale accumulations were of sufficient size to reduce pipe openings and lessen gas pressure. To combat this stoppage, the company borrowed the principle of the vacuum cleaner. This system makes it possible for service men to clean scale from pipe walls with cutters while the gas is on, for a compressor draws both gas and scale out of the line, thus eliminating danger.

Truck-mounted compressors and aspirators are used for large jobs; smaller, portable vacuum cleaners are adequate for minor stoppages.

Service crews also carry equipment for blowing gas pipes from meter to appliances. Preferably, lines are blown toward the meter, so that no dirt is left in the house. A dust bag at the end of the line is further insurance against leaving dirt behind for the customer to clean up.

While Milwaukee Gas Light's service operations were at normal volume, the company started testing pressures. Wherever it was found that pressure was low because of rust or scale accumulation, permission was asked of the customer to allow the lines to be cleaned—at company expense.

Reprinted courtesy Milwaukee Gas Light Co. *Gas News.*

Gas Future: Double and Double Again

New AGA president tells Chicago conventioneers of bright outlook if advantages are seized

By EDWARD TITUS

DOUBLE. And double once again before long.

That's the gas industry's sales record for the years just passed and those just ahead, as summed up by new President Hugh H. Cuthrell of Brooklyn Union, at AGA's 31st annual convention in Chicago Oct. 17-20.

Revenues of the industry have increased more than 100% since 1938. And, said Mr. Cuthrell:

"All the elements are in the picture for again doubling revenues if we seize the advantage of our expanding economy."

The theme of this great meeting, near the spectacular shore of Lake Michigan, attended by some 6000 from all over the United States and from other countries, might be called The Challenge of New Horizons. Leaders of the industry in snappily staged general session meetings and technical, accounting, home service, industrial and residential sessions, got down to the brass tacks of:

1. The opportunity.
2. How to meet the opportunity, promotionally, technically and financially.

Gas' Finances

Importance of the financial end was pointed up by the appearance of Emil Schram, president of the New York Stock Exchange, as a keynote speaker Thursday. Mr. Schram, talking on "Equity Capital" relayed to a packed audience some down-to-earth common-sense thoughts about how to dramatize the possibilities of investment in the American free enterprise system (including the gas industry) to the American public.

From Brooklyn to Hollywood—said Robert W. Hendee, president of AGA for the year just ended—from Beacon Hill to the prairies, from Maine to Mexico, "the Old Stove Roundup is sweeping the nation," kindling the aggressive spirit of an alert gas industry.

The Roundup is going over with a bang: Hugh Cuthrell, for instance, reported that with Brooklyn Union retail sales are up 40% since the start of the campaign.

The Roundup is one answer to "How the Gas Industry Can Seize its Opportunity."

The Soundest Way

The soundest way to seize the opportunity —selling the industry to investors—was touched on also by President Hendee, who pointed out that the gas industry is not alone in its estimate of its resources and its potential growth. Recent published statements from Wall Street and vicinity, addressed to the attention of the investing public, were cited. Typical is the appraisal by the Fitch survey:

> "Human ingenuity combined with enormous natural resources has made the natural gas industry one of the wonders of our industrial age. It is clear that natural gas is destined to become one of the most important factors in the industrial development of the nation."

The convention got going at a swift pace Monday morning with an outstanding natural gas meeting led off by D. A. Hulcy, chairman of the Natural Gas Department, president of Lone Star Gas in Dallas, and now first vice president of AGA.

"Our network of transmission lines, both interstate and intrastate," said Mr. Hulcy, "now measures over 251,000 miles, exceeding that of the oil pipelines by over 100,000 miles and that of the main line railroads by more than 17,000 miles." It now delivers about 3 trillion cubic feet of gas annually to the gas utility companies of the country.

Mr. Hulcy declared that one of the greatest demands for gas service in the future will be in the housekeeping field.

Referring to a recent house-heating survey by AGA, Mr. Hulcy cited the following facts:

Out of nearly 20 million consumers studied, 6.6 million are now using gas for space heating.

37% Saturated

Another 693,000 will become space heating customers in the winter of 1949-50, resulting in saturation of nearly 37%.

In Kansas, Louisiana, Mississippi, Oklahoma and Texas saturation is virtually 100%.

In California there are 2.3 million residential customers and 96%—2.2 million—use gas for space heating.

Ohio has about 1.5 million residential consumers and 560,000—37%—will be using gas for heating.

Said Mr. Hulcy:

"I submit, gentlemen, that with a possible saturation of over 50% in areas above 35° latitude in this country, new horizons will be opened on problems of rates and public regulation . . ."

W. T. Bulla, Natural Gas Pipeline Co. of America, Chicago, under title of "Our Place in the Spectrum," presented a picture of the rapidly moving development of mobile radio in the gas industry.

In 1944, said Mr. Bulla, the gas industry had fewer than 50 base stations and 200 mobile units in service.

The picture now is:

373 base stations operating or being built.
214 more base stations proposed by 1951.
2707 mobile units now operating.
1241 more mobile units proposed by 1951.

The potentially great importance of new off-shore gas well discoveries was covered in detail by a paper in which Henry C. Cortes and R. N. Gsell of Magnolia Petroleum Co., collaborated.

Edward J. Tucker, vice president and general manager of Consumers Gas Co. of Toronto, Can., opened the Manufactured Gas Department session with a realistic description of far-advanced public ownership of the gas industry in Europe, based partly on his recent trip.

Research was covered by John H. Wolfe of Baltimore and forecasting by John B. Boniface

(Continued on Page 57)

Most highly honored man at the AGA convention was the 1949 recipient of the coveted Distinguished Service Award—James A. Brown, president, Michigan Gas Storage Co., Jackson. His achievements in the production and sale of by-products of manufactured gas, designing of distribution systems for adequacy and economy, improvements in large-volume metering, increasing the capacity of water heaters, and storing gas underground were recognized as contributing more than any other man's toward the advancement of the industry.

Edward G. Boyer, gas department manager, Philadelphia Electric Co., for the second successive year gained the Beal medal as a reward for contributing the best paper presented at an association meeting during the past year. The paper, "Meeting the Peak Load Problem," was published in shortened form in the January, 1949 issue of GAS (p. 49).

Also a second-time winner was The Ohio Fuel Gas Co., Columbus, two of whose distribution units recieved merit awards for accumulating more than 1 million man hours without a disabling injury accident.

Highest individual performances in the field of gas house heating were achieved by Dwight M. Baker, Oklahoma Natural, Tulsa, who won first prize of $500 for development of a six-lesson educational course; E. E. Boegli, South Carolina Power, Charleston, for an educational program; and Garland Galloway, Cumberland County Gas Co., Vineland, N. J., for a promotional campaign.

Houston Natural Gas Co.'s campaign which sold 228 units in a year won the progress award for gas summer air conditioning. The presentation of $1000 and a plaque was made to L. L. Ladewig, manager of the company's air conditioning department.

E. G. Boyer

J. A. Brown

of Public Service Electric & Gas Co., Newark, N. J., who in starting his discussion of utility forecasting, confessed:

"I have none of the occult powers of a Major Angus or a Dunninger."

Mr. Boniface did, however, bring his audience up to date on what could be done scientifically on the almost occult forecasting problems.

Plenty of Thinking

Plenty of thinking was involved in the talk of Harry M. Miller, of the Public Utilities Commission of Ohio, president of the National Assn. of Railroad & Utilities Commissioners, on "Duplication of Regulation," a top topic of the day.

Mr. Miller summed it up early:

"I have considerable hesitancy in relying upon precedents from decisions of the Supreme Court. It sometimes changes its collective mind."

GAMA participated most constructively through its president, Frank Nugent, who pointed out that the association performs 70 different services to its members and is also on the team that's successfully promoting financial vigor of the gas industry with the banks in downtown New York.

Opening Wednesday's general session, W. F. Brown, safety director of Consolidated Edison, New York, announced that his successor as head of the AGA's accident prevention committee would be Paul Hasskarl, Pennsylvania Power & Light, Allentown.

Mr. Brown introduced Dr. Ned V. Dearborn, president, National Safety Council, Chicago, who attacked the idea of "Let George Do It" as follows:

"When you work to stop accidents in this country, you run into the good old American philosophy of 'Let George do it'—let George serve on the committees, let George do the button-holing, let George foot the bills. But the sad fact is there are not enough Georges. It's time for Tom, Dick and Harry to get busy, too."

Place of Honor

Commercial cooking had a place of honor in the fourth day's general session with Frank H. Trembly Jr., sales manager of The Philadelphia Gas Works Co., telling "Why the Commercial Cooking Load Belongs to the Gas Industry."

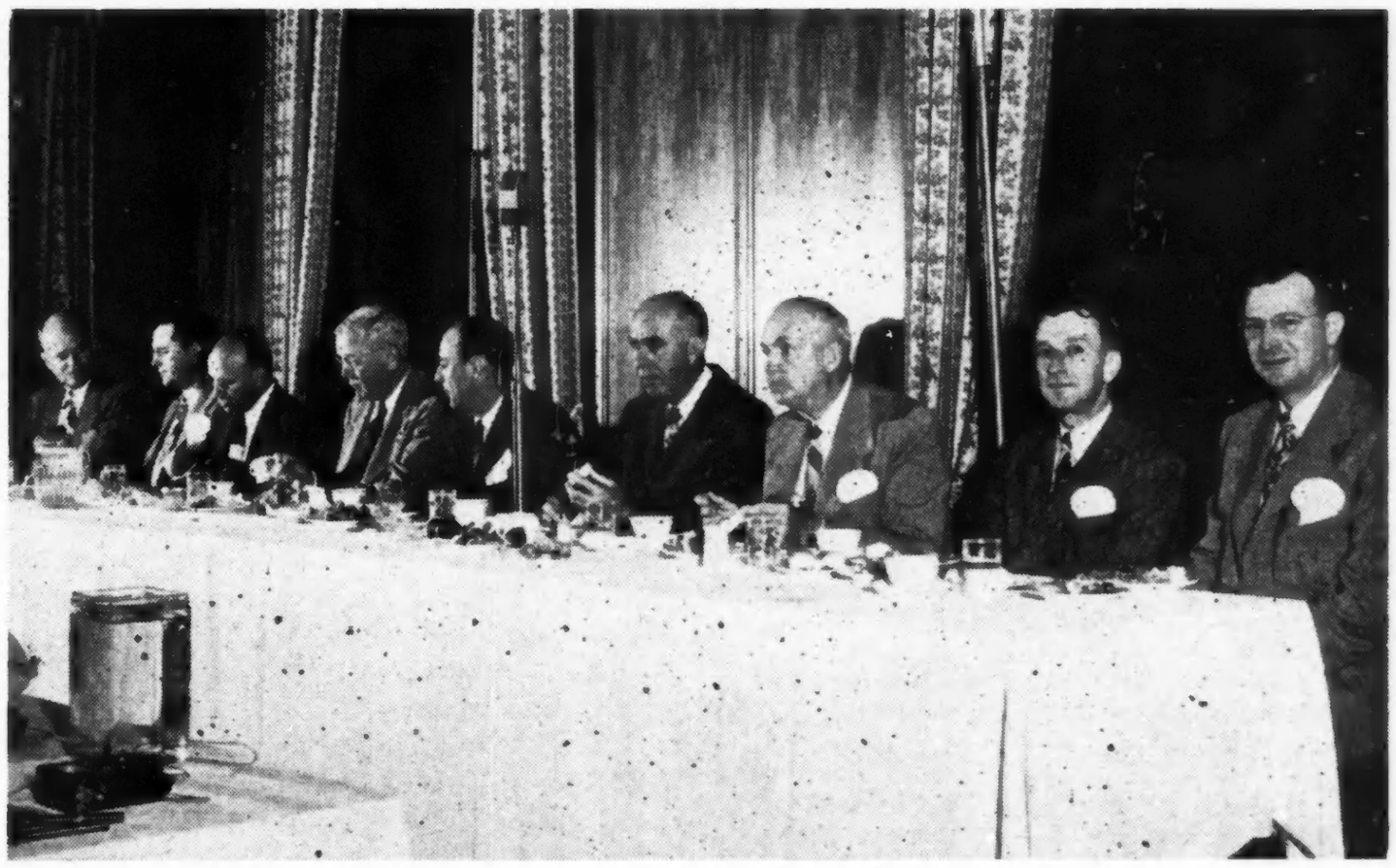
Meanwhile, accounting in all its phases took on an added importance this year. Breadth and variety of the accounting program keeps growing year after year.

A highly successful home service breakfast and round table were held under the chairmanship of Eleanor Morrison of Michigan Consolidated.

The Industrial and Commercial Gas luncheon and meeting drew capacity crowds to hear discussions such as that of Charles Eeles of Ohio Fuel Gas on "Sales Techniques to Meet Tomorrow's Competition."

Carrying out the theme of how to meet the opportunity, Harold Massey, assistant managing director of GAMA, pointed to the basic appeal of the automatic clothes dryer, the gas incinerator and the all-year gas air conditioner.

Meanwhile, the technical section got down to detailed know-how to carry out the gas industry's opportunity. We'll publish more about their conclusions in subsequent issues.



Officials and speakers at the head table during this Oklahoma Utilities Assn. luncheon included D. W. Reeves, Oklahoma Natural (far left); H. N. Oldham, Southern Union; W. H. Carson, Oklahoma University; R. O. Weems, Oklahoma Corporation Commission; R. W. Camp, gas division chairman; Malcolm Morrison, OUA president; W. Kemp Walker, state commission; John West Jr., AGA; H. G. Pegues, United Gas Pipe Line Co.

RADIO EXTOLLED

Use on pipeline detailed at Oklahoma gas meeting

"Dependable natural gas service has a new and powerfully sustaining tool in the radio telephone network," said H. G. Pegues, United Gas Pipe Line Co., Shreveport, La., addressing the 1949 gas division meeting of the Oklahoma Utilities Assn., at Oklahoma City, Oct. 7.

Installation of a two-way radio telephone network was described by Mr. Pegues as "one of the steps in the overall program of our company in preparation for the anticipated high demand for natural gas in the postwar period." The new system was primarily designed to complement existing telephone communication facilities with a means of instant contact, which "under many conditions is of utmost importance to uninterrupted service," the speaker asserted.

The two-way radio telephone supplements 3200 miles of telephone lines in effecting split second coordination of pipeline operations along 1000 miles of field gathering lines and 6500 miles of main transmission lines.

A considerable saving can be made with the aid of radio communication in building new pipelines over rough terrain. Mr. Pegues added that it also is used to advantage in running pigs through the lines to clean them and purge the air preparatory to placing the line in service.

A visual demonstration of catholic protection as applied by the Oklahoma Natural Gas Co., Tulsa, was presented in slides and exhibits by W. R. Kubista, chief engineer. He stated that about two years ago his company applied this type of protection to its pipelines in the vicinity of Shawnee at a cost of approximately $2500 and has saved an estimated $50,000 in construction costs as a result of its use on this and other parts of its system.

On a table in the civic room of the Biltmore hotel, where the sessions were held, were displayed a number of the instruments used in the cathodic protection system, including soil resistivity meters, soil rods, copper sulphate electrode, type "3" bare anode, a used anode which had been used in the ground one year and had been connected to the pipe six months, and several accessories.

The history of cathodic protection goes back to 1823 in England when iron plates were attached to the copper bottoms of ships to lessen corrosion. Illuminated slides showed some simple anode installations. It sometimes takes from six months to a year to get the full protection of the installations, the speaker said; therefore new lines should be coated as this cost is relatively small.

The close relation between sales and service was emphasized by H. N. Oldham, district manager, Southern Union Gas Co., Carlsbad, N. M.

"I wish that every gas company executive and employee could get absolutely away from the idea that there is such a thing as free service," he said. "Someone is paying for the maintenance of the service department and that is the customer."

John West Jr., AGA assistant managing director, New York City, reported that as a result of last year's advertising campaign, the association increased its advertising in national consumer magazines by 50%. The range manufacturers more than doubled theirs, the gas utilities and dealers doubled their local advertising of ranges. The result was that the sale of automatic gas ranges was more than twice as great and for the first time in many years total advertising of gas ranges equalled that of electric ranges.

The gas division meeting opened with a color film presented by the Oklahoma Natural Gas Co. and titled "Pipe Dreams Come True." In it nearly every phase of Oklahoma Natural activities was pictured. The closing feature was a talk on the development of small "backyard" industrial enterprises in Oklahoma and the southwest, presented by Ken Miller, radio station KVOO, Tulsa.

Richard W. Camp, vice president, Consolidated Gas Utilities Corp., Oklahoma City, and chairman of the gas division, presided at the business session.

CALENDAR

NOVEMBER

American Petroleum Institute—Stevens hotel, Chicago, Nov. 7-9.

National Hotel Exposition—New York, Nov. 7-11.

Mid-Southeastern Gas Assn.—Raleigh, Nov. 10-11.

New Jersey Utilities Assn. Annual Meeting—Seaview Country Club, Absecon, Nov. 17-19.

Wisconsin Utilities Assn. Annual Meeting—Milwaukee, Nov. 21-23.

American Society of Mechanical Engineers Annual Meeting—New York, Nov. 27-Dec. 2.

National Personnel Conference of the Gas Industry—Netherland Plaza hotel, Cincinnati, Nov. 28-29.

DECEMBER

The American Society of Refrigerating Engineers Annual Meeting—Edgewater Beach hotel, Chicago, Dec. 4-7.

JANUARY

Southwest Air Conditioning Exposition—State Fair Grounds, Dallas, Jan. 23-27.

MARCH

New England Gas Assn.—Hotel Statler, Boston, March 23-24.

Southern Gas Assn.—Galveston, March 27-29.

APRIL

AGA Distribution Motor Vehicle and Corrosion Conference—Book Cadillac hotel, Detroit, April 3-5.

AGA Sales Conference of Industrial and Commercial Gas Section—St. Louis, April 4-6.

Mid-West Gas Assn.—Hotel Lowry, St. Paul, April 10-12.

Southwestern Gas Measurement Short Course—University of Oklahoma, Norman, April 11-13.

National Petroleum Assn.—Hotel Cleveland, Cleveland, April 12-14.

National Conference of Electric and Gas Utility Accountants—Brown hotel, Louisville, April 17-19.

Florida - Georgia Gas Assn. 1950 Business Conference—Biltmore hotel, Palm Beach, April 20-22.

Indiana Gas Assn.—French Lick Springs hotel, French Lick, Ind., April 28-29.

MAY

AGA Commercial Gas School—Cincinnati, May 1-5.

AGA Natural Gas Department Spring Meeting—Mayo hotel, Tulsa, May 8-9.

AGA Gas Production and Chemical Conference—Hotel New Yorker, New York, May 22-25.

Gas Appliance Manufacturers Assn. Annual Meeting—The Greenbrier, White Sulphur Springs, W. Va., May 22-24.

ASME Sets Program For Annual Meeting

The fields of heat transfer, fluid flow, and mass transfer distillation and absorption will be explored in the principal technical papers scheduled for presentation at the 1949 annual meeting of the American Institute of Mechanical Engnieers to be held in Pittsburgh, Dec. 4-7.

Included in these categories are these specific subjects: thermal data for gases at high pressures, heat transfer media, fluidized systems, and fixed porous beds; correlations of heat transfer coefficients for finned tubes; velocity distribution of turbulent mixing in isothermal free jets, etc.

A round of selected plant trips to nearly a dozen Pittsburgh plants including Carnegie-Illinois Steel Corp., Mellon Institute and Koppers Co. Inc. is another special feature of the conference. Four professional awards will also be made at the institute's meeting.

IPAA Frets Over Imports

Worry over the effect of imports of foreign oil on the domestic market filled the minds of gas and oil men attending the 20th annual meeting of the Independent Petroleum Assn. of America held in Fort Worth Oct. 2-4.

More than 1000 men in attendance heard Walter S. Hallanan, president of Plymouth Oil Co., denounce the proposed use of the European Recovery Plan to finance foreign oil production facilities. J. E. Warren, president of Carl B. King Drilling Co., was elected new president of the association, succeeding Fred Shield.

Midwestern Gasmen Study Industrial Applications

In a near record-breaking temperature of 85°, an enthusiastic group of 100 industrial gas men from the Midwest gathered in Chicago at the Hotel LaSalle on Oct. 7 to attend the fall meeting of the Midwest Industrial Gas Council.

A paper prepared by W. R. Anson, General Refractories, Joliet, Ill., on "The Application of Gas to Silica Firebrick Burning," was delivered by Alex E. McCornack, Western United Gas & Electric Co. He was followed by Slade Gamble, Lindberg Engineering Co., Chicago, who spoke on "Low Temperature Vitreous Enamel Furnaces."

The afternoon session included a talk on "Sales Philosophy" given by H. E. Jalass, Cribben & Sexton Co., Chicago, and a demontration, using bottled gas, by J. D. Sexton, Harris Calorific Co., Chicago, of "The Use of Natural and Manufactured Gas in Flame Cutting and Brazing."

The annual meeting of the council will be held in Chicago at the LaSalle, Jan. 27, 1950.

NACE Division Names Statham

T. R. Statham, Magnolia Pipe Line Co., Dallas, heads up the slate of officers for the south central region of the National Assn. of Corrosion Engineers as a result of elections held in conjunction with the regional meeting held in Dallas Oct. 3-4.

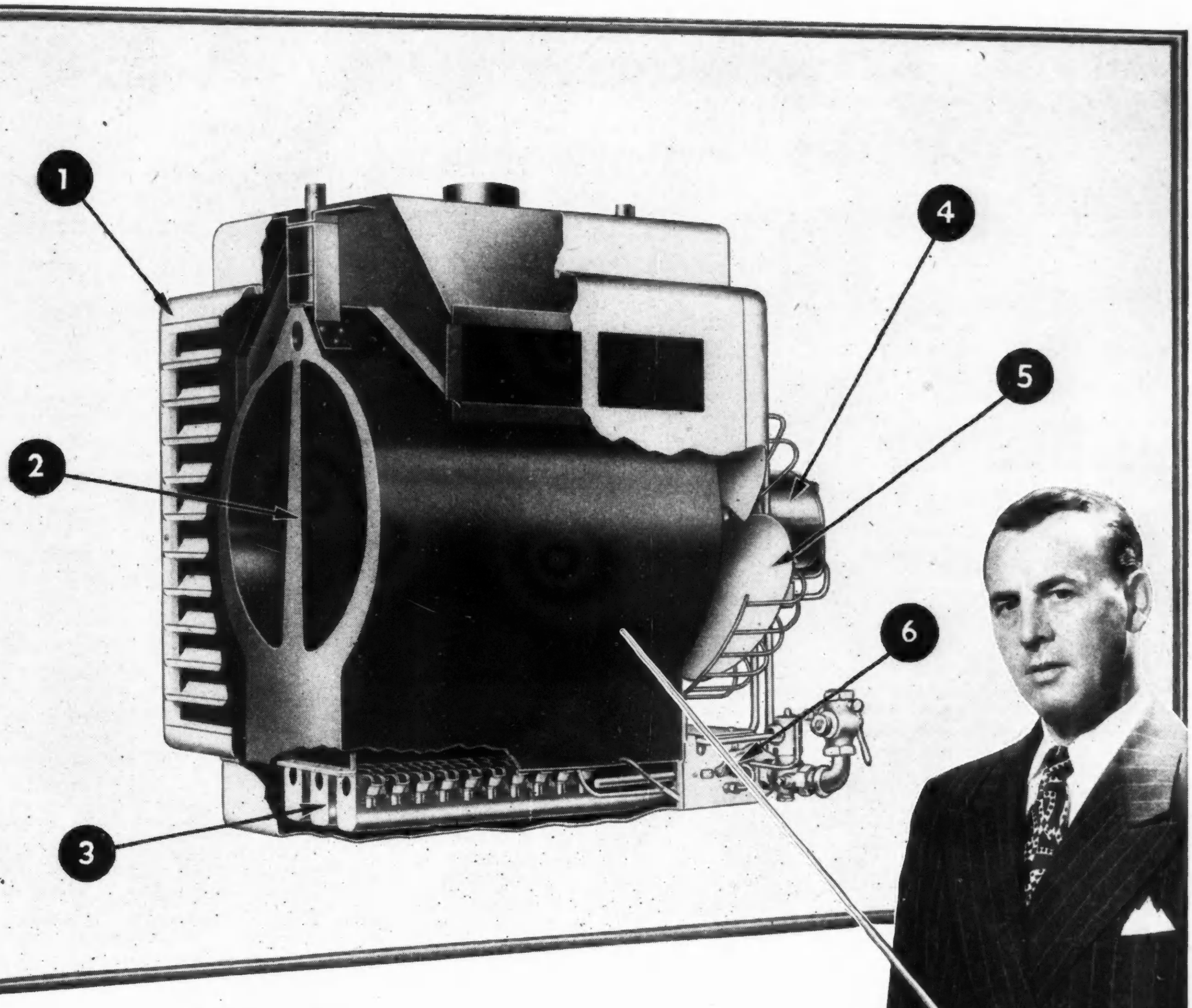
How to control corrosion in the field, the refinery, and the pipeline was discussed in papers presented at the meeting. Methods covered in the various talks ranged from developments in protective coatings and the use of magnesium anodes to the use of ammonia in crude oil storage tanks.

A round-table discussion led by L. F. Scherer of Texas Pipe Line Co., Houston, was one of the highlights of the two-day meeting.

Supplers Publication

A new membership list with a revised constitution and by-laws and "many remembrances of the Gild's first 10 years" was distributed last month by the Gild of Ancient Supplers. The publication is profusely illustrated with photographs of Gild wassails and breakfasts.

Bert Roberts (left), Minneapolis Gas Co., and Fred Utterbach, Public Service Co. of Northern Illinois, Chicago, are shown looking over future plans for the Midwest Industrial Gas Council at the council's fall meeting in Chicago last month. They are chairman and vice chairman respectively.



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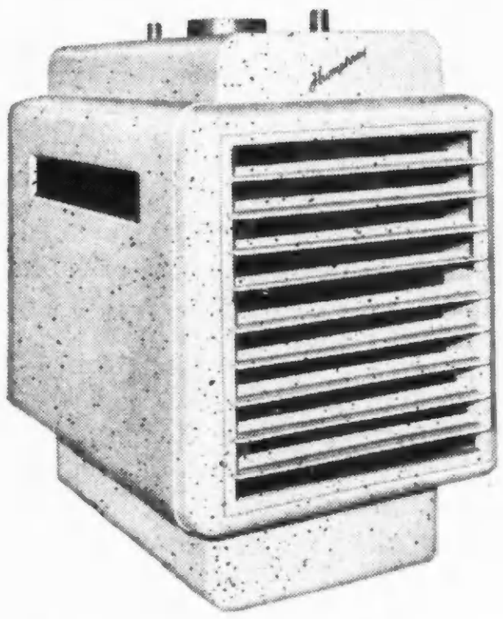

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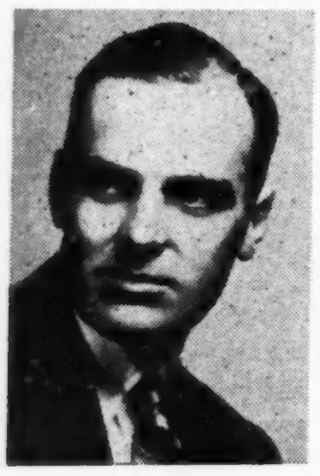

F. Donald Hart

New chairman of GAMA's marketing committee is F. Donald Hart, executive vice president of the Tennessee Enamel Manufacturing Co., Nashville, Managing Director H. Leigh Whitelaw announced last month.

D. R. Meckstroth of Servel is vice chairman.

Mr. Hart is also vice chairman of the direct heating equipment division and a member of GAMA's gas floor furnace group. He succeeds R. T. Killian, Bryant Heater Division, having taken office at the close of the committee's meeting in Chicago on Oct. 19.

Gas Plant Talk Headlines CNGA Fall Meeting

Elements in the design of Barnsdall's Newhall-Potrero gas and gasoilne plant comprised one of the chief attractions for gasmen attending the California Natural Gasoline Assn.'s 24th annual fall meeting held Oct. 7 in Los Angeles.

Such features of the plant as the elimination of plant vapors by complete condensation of still overhead and process steam generated without fire by use of waste heat from lean oil were described by Melroy Welch, superintendent of Barnsdall's gas department, who presented the talk.

The all-day session drew its usual large and enthusiastic crowd. Gasmen prominent on the program included Marion Fort, Pacific Lighting Corp.; Ira C. Bechtold, The Fluor Corp., and Coles Bason, Ingersoll-Rand Co., all of whom participated in the association's popular "Information Please" session in the afternoon.

15 Join AGA Exhibit For National Home Show

Fifteen manufacturers of commercial cooking equipment have joined forces to sponsor the combined exhibit of the AGA at the National Hotel Exposition coming up at the Grand Central Palace, New York, Nov. 7-11.

A new feature in the joint effort will include a water heater and dish washer, in keeping with the drive for the all-gas commercial kitchen. Exhibitors are keying their display to current sanitation promotion.

Editors of publications in the food service and hotel fields will again be guests of the Industrial & Commercial Gas Section at the second annual breakfast to be held Nov. 8 at the Roosevelt hotel. Donald B. Gridley, Patterson Publishing Co., Chicago, will be the principal speaker.

Pacific Chemical Show Set

The future of energy sources in the western states—including gas, liquid petroleum, coal, oil shale, and water power—will be discussed at the Pacific Industrial Conferences to be held in conjunction with the 1949 Pacific Chemical Exposition in San Francisco Nov. 1-5.

Under auspices of the Petroleum Division, American Chemical Society, California Section, and the American Institute of Mining Engineers, noted speakers will discuss potentials of these energy sources. Roy Wehe, consulting engineer and former engineer for the California Public Utilities Commission, has been selected to talk about gas.

API Meeting to Fete 90 Years

Ninety years of progress will be the theme of the American Petroleum Institute's 29th annual meeting to be held in Chicago Nov. 7-10. Over 5000 oil men are expected to crowd the Stevens hotel and the Palmer House for the big meeting.

Top speakers will include William R. Boyd Jr., API president; Robert E. Wilson, chairman of the board of Standard Oil Co. of Indiana; J. Howard Pew, retired president of Sun Oil Co., Philadelphia; and Edmund P. Learned, Harvard graduate school of business administration.

Four NEGA Conferences Set

Four more New England Gas Assn. conferences have been scheduled for the next three months, according to Executive Secretary Clark Belden.

The home service development conference will convene in Boston Nov. 7, followed by the safety conference Nov. 15. Locale for both is the Hampshire House. In January a meeting of the operating division at Hotel Statler, Boston, on the 18th, will be followed by an accounting division gathering Jan. 26 at the same hotel.

Kreutzer for White in LPGA

Arthur C. Kreutzer

Arthur C. Kreutzer, who since 1946 has been counsel and secretary of the Liquefied Petroleum Gas Assn., has been made managing director to replace Howard D. White, executive vice president, who resigned Oct. 31.

A graduate of De Paul university's school of law, Mr. Kreutzer was engaged in private law practice from 1931 to 1941, during which time he frequently represented trade associations. During the war he served as lieutenant commander in the Navy.

Coincidentally with Mr. Kreutzer's appointment, the LPGA announced approval and support of a nation-wide promotional program which other associations, including GAMA, are expected to joint shortly. Broad-scale advertising and publicity campaigns, employee training courses, and special public relations activities are planned.

News

EXPANSION

Space Heater Sales Boom As Detroit Ban Lifted

Michigan Consolidated Gas Co. has gone back into the space heating business with a vengeance. Its total space heating load was boosted by 70% in the first two months after the space heating ban was lifted Aug. 1. Between that date and Sept. 24 the company added 76,517 space heating customers, of whom 66,818 are located in the city of Detroit. As of the latter date, the grand total stood at 186,039.

Eight hundred applications per day were still flowing in, according to a recent announcement by the company, and no slackening was in sight. Michigan Consolidated had not as yet set any limit on the number of new applications which it proposed to accept.

The Detroit utility's action was predicated on the coming of additional volumes of natural gas through the new natural gas pipeline which its affiliate, Michigan-Wisconsin Pipe Line Co., is building from the Hugoton field to Detroit and other Midwestern communities. The line is expected to be in operation about Dec. 1.

Meanwhile, other important areas were also beginning to open their doors to the space heating business. In New York the public service commission modified its space heating limitations from a 350,000-Btu per hour ceiling to 500,000-Btu. These figures were the maximum requirements allowed for new space heating installations.

Thus, many large homes, public and religious institutions, and small commercial users can now be served. The commission's action was based on additional quantities of gas from the Big and Little Inch lines, Tennessee Gas Transmission Co.'s lines, and the Consolidated and Columbia gas systems, plus increased storage capacities and distribution facilities which would make it possible for a number of large companies to expand services.

Four companies were permitted unrestricted installations. These were Rochester Gas & Electric Corp., Empire Gas & Fuel Co. Ltd., Producers Gas Co., and Republic Light Heat & Power Co. Four other companies were placed under the 500,000-Btu limitation. These are Binghamton Gas Works, Keystone Gas Co. Inc., Rockland Gas Corp., and New York State Electric & Gas Corp. The last-named company was permitted to expand its services only in the Goshen and Oswego districts.

Brooklyn Union Gas Co. has been permitted to add 3500 space heating customers which will have the effect of reducing the extensive waiting list.

In Wisconsin the public service commission has given Milwaukee Gas Light Co. permission to resume contracting for space heating. The new order came as a result of the start of changeover to natural gas in the city.

ACKNOWLEDGMENTS

Leon J. Willien, research engineer, San Diego Gas & Electric Co., has requested that acknowledgments be published in connection with the condensed version of his paper, "A Method of Continuously Detecting Entrained Materials in Gas Streams," which appeared in September GAS on page 74.

According to Mr. Willien, the recorder described in the article was invented by C. W. Stewart, who was at the time general foreman of the San Diego gas meter shop. The method of determining whether the brown line traced on the chart is oil gum or gas main dust was developed by C. Eldon White, chemist for the utility.

$20 Million Building Job For Peoples Nearly Done

More than 80% of its three-year, $20 million expansion program has now been completed by Peoples Natural Gas Co., Pittsburgh. The program will prove of direct benefit to more than 200,000 customers throughout western Pennsylvania.

Having finally overcome the difficulties of material shortages, the company expects to complete the program by the end of the year. Included are 106 wells drilled in 1947-48 in search of nearby supplies of natural gas to help meet winter peaks, 38 wells drilled in 1949, three new compressor stations with a fourth under construction to increase underground storage facilities, 20 storage wells drilled in 1947-48 with 15 more scheduled for 1949, and extensive improvements in both the main transmission system and the distribution system.

A 37-mile line from the Big and Little Inch in southern Pennsylvania is the main feature of this phase of the work.

Philly Cuts Off Heat Permits

Philadelphia Gas Works Co. has reached the limit of its capacity on new gas heating applications and early last month closed its doors to late comers. It will probably resume installations after March 1, 1950, however.

The company is asking the city council for an additional $3 million to expand its manufacturing and distribution facilities next year, and an increase in the house heating load is expected to result. The company, a subsidiary of United Gas Improvement Co., operates the city-owned gas plant under a lease.

IGT Installs Research Plants at Crawford Station

The first of several large research plant units that will be set up at the Crawford station of Peoples Gas Light & Coke Co., Chicago, has been constructed by the Institute of Gas Technology. The building used for the program is the former producer gas building which was recently reconditioned.

The pilot plant has been set up in four 20 x 20-ft bays having 50-ft head room. The height of the building was important as the institute's laboratories on its campus could not accommodate such installations.

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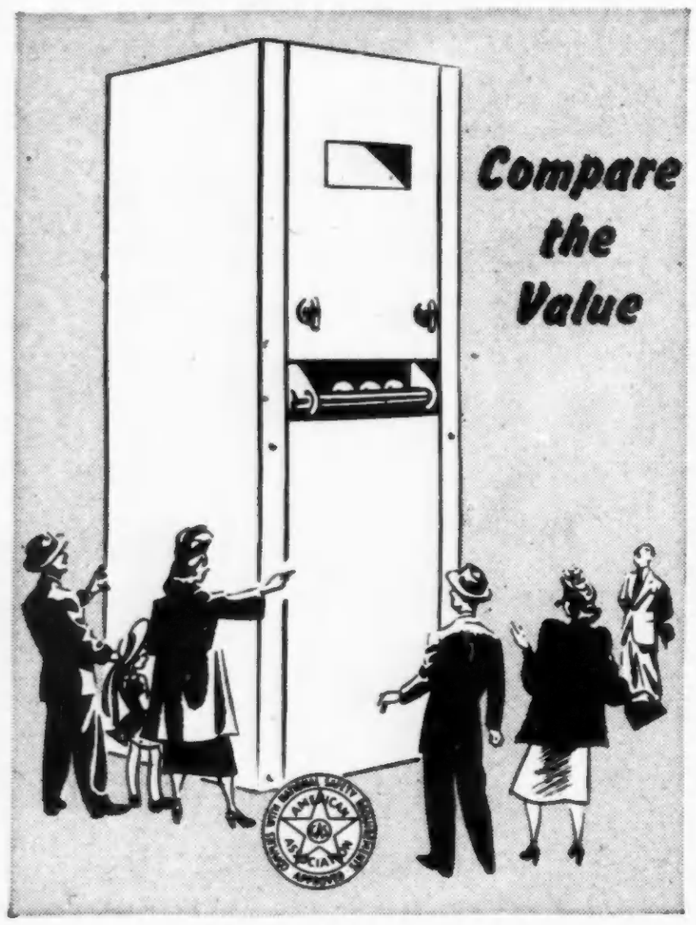

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NEW OFFICE FOR GETTYSBURG

Manufacturers Light & Heat Co. has gone modern in Gettysburg, Pa. The new business office at 15 York St. was opened early this summer. Shown in the top photo is the New Freedom demonstration kitchen which boasts five gas-fired appliances as well as seating capacity for 60 persons. The center view shows the front office with its grained wood bill - paying counter into which standard steel desks were built. Lower photo is a general exterior view of the new office. Manufacturers Light & Heat absorbed Gettysburg Gas Corp. in 1949.

which the institute is carrying on for the AGA gas production research committee will be housed at Crawford station. One is intended to develop a continuous process for the production of 500-1000-Btu utility gas from intermediate high carbon oils, employing finely divided particles of matter as heat-carrying media. A sulphur removal pilot plant is the second unit in the research program, while pressure gasification is the third study for which a pilot plant is to be erected.

Gasair Builds PG&E Plant

Construction of a propane-air plant at Colusa, Calif., was started last month by Gasair Associates, San Francisco, for Pacific Gas & Electric Co. The 25 Mcf per hour plant will supply an interchangeable propane-air gas to supplement natural gas during peak demand.

Three other Gasair plants are in operation on the PG&E system at Redding, Red Bluff, and Grass Valley, Calif.

Cracking Plants Converted

Three catalytic cracking plants originally constructed to employ a variety of feed stocks to provide peak load shaving are now being converted for service this winter as base load plants. With the advent of natural gas to the Harrisburg-Allentown-Reading, Pa., area, the three local gas utilities have decided to employ their cracking plants for the conversion of natural gas to coke oven gas as a base load operation.

They are to be ready for the coming winter season. The Harrisburg and Reading plants, which were put into operation last winter, were intended to be converted for natural gas usage at the time of their construction. The Allentown plant has just been completed and is scheduled for immediate adaptation to natural gas base load operation.

The reformed gas to be produced in the catalytic units will be completely interchangeable with coke oven gas regularly supplied by

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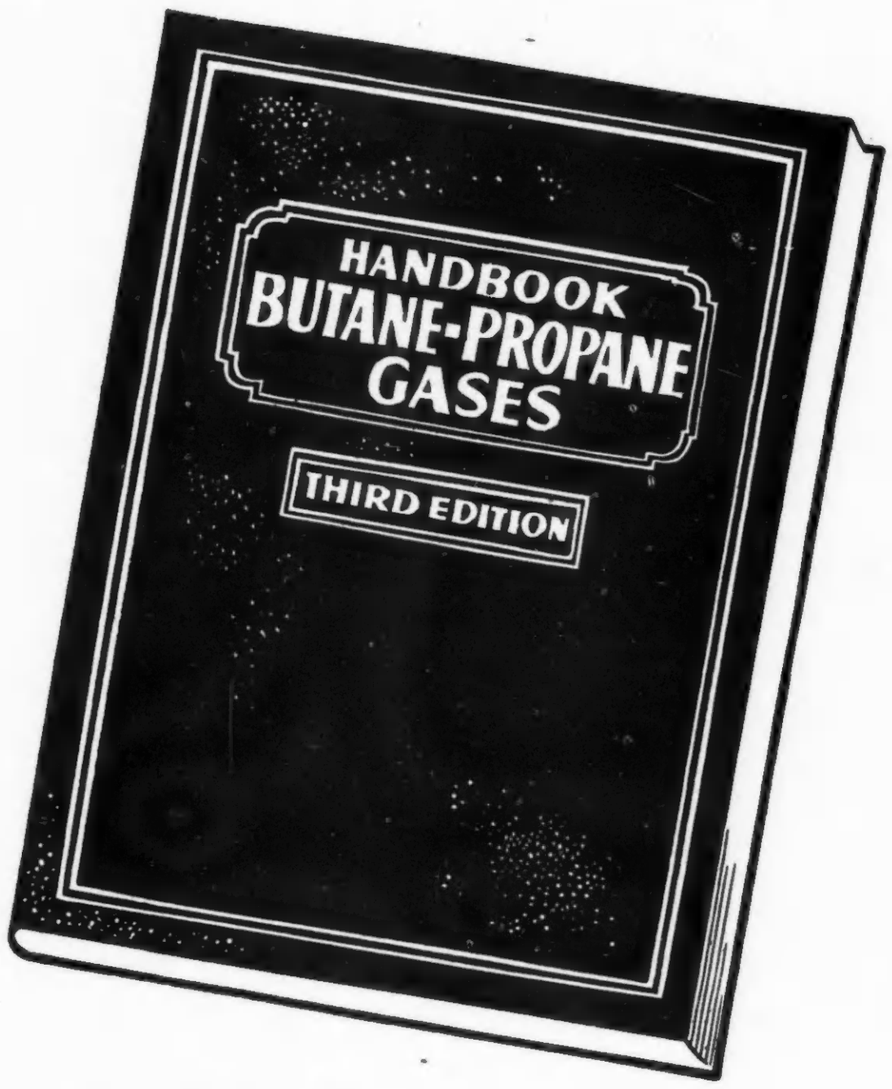

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Relief Valves: High or Low Pressure

Back Pressure Valves
Automatic Quick-Closing, Anti-Vacuum Valves.

Automatic Shut-off Valves • Vacuum Regulators
Lever Operated Valves • Louver Operated Device
Atmospheric Regulators

GAS CONTROL SINCE 1892

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

MEASURE AIR OR GAS WITH

cash-register accuracy

(Above) Typical small-size R-C Meter with inclined differential gauge, with top inlet, and outlet in bedplate.

•

(Right) Example of large-size, low-pressure R-C Meter, side inlet box and bottom outlet, with a P.V.T.T. Recorder.

Built-in characteristics of R-C Positive Displacement Meters insure unfailing, long-time accuracy:

1. Accuracy is not affected by variations in specific gravity, rate of flow, pulsation, moisture or impurities.
2. Accuracy does not depend on uncontrollable factors.
3. Accuracy is not subject to adjustment of meter or recorder by operators.
4. Accuracy is not affected by reasonable overloads.
5. Accuracy is permanent because measuring chambers are surrounded by precision-machined cast iron surfaces.

R-C Meters are built in 31 standard sizes, with capacities from 4,000 to 1,000,000 CFH. Indicating and recording instruments are available for all types. Send for details in Bulletin 40-B-14 or write us about your specific problem.

ROOTS-CONNERSVILLE BLOWER CORPORATION
911 Oregon Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE

BLOWER BUILDERS • R-C • SINCE 1854

BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

★ ★ **ONE OF THE DRESSER INDUSTRIES** ★ ★

the three utilities. Surface Combustion Corp., Toledo, Ohio, which has contracted for the conversions, predicts that considerable economies will be afforded by conversion of natural gas to coke oven gas replacement over direct distribution of natural gas to consumers. Changeover is avoided and economic utilization of present sources of coke oven gas to augment that produced by the cracking unit is possible.

MISCELLANY

Solid Adsorbent Storage Pilot Plant in Operation

Initial operation began recently in Warren, Pa., of a new type of storage facility for natural gas which uses a solid fireproof adsorbent material within an above-ground container.

In this pilot plant, methane stored on the granular adsorbent "Fullers earth" will not flow away as a liquid nor escape readily as a gas. It is believed that the fuel stored in this manner will be difficult to ignite.

According to C. V. Spangler of the Pittsburgh office of J. F. Pritchard & Co., this is the first pilot plant to be created for the testing of an entirely new method for the storing of natural gas.

Storage on adsorbents is being developed as a safe method to meet the pressing need for additional off-peak storage. Storage plants provide a place to put off-peak gas as contrasted to peak load plants that make gas from other materials. Since the stored gas is the same gas as that distributed, there are no interchangeability problems involved. Plants using adsorbents for storage would present no more than ordinary gas plant operating hazards.

Present plans call for a thorough testing of this storage method with the pilot plant, which was placed in operation during the week of Oct. 10 by J. F. Pritchard & Co. in conjunction with the Floridin Co. of Warren, Pa. A demonstration run is planned which may be witnessed by gas company engineers.

Lab Revises Fee Schedule

Withdrawal of the 5% discount formerly granted for prompt payment of fees was announced last month by the AGA Testing Laboratories' managing committee. Expansion of the inspection department was simultaneously authorized to expedite the progress of unannounced inspections.

100 TH BIRTHDAY

Brooklyn (N.Y.) Union Gas Co. is 100 years old this year and it is going to celebrate the occasion with a big party for employees and guests at the Hotel St. George on Nov. 2.

A dance, which is the main feature of the celebration, will be preceded by ceremonies honoring persons who have had long service with the company and others who have performed actions of outstanding heroism or have distinguished themselves in other ways.

Third Research House Dedicated At Urbana

The third warm air heating research residence to be built by the National Warm Air Heating & Air Conditioning Assn. for the purpose of testing heating systems under actual living conditions was dedicated late in September in Urbana, Ill. Component of the 31-year-old heating research program which the association has carried on in cooperation with the University of Illinois, this new residence was designed to develop methods which will economically and efficiently overcome heating problems inherent in low-cost construction methods being used today.

It is a 4½-room basementless house considered typical of the low-cost homes in the $9000 to $10,000 class currently in vogue. Frame construction is used throughout with concrete slab being used for the floor. Design features which pose problems in adequate and economical heating include the concrete slab floors, which are difficult to keep warm and dry at minimum cost, and the elimination of storm windows, weather stripping, and wall insulation.

Although elimination of such weather proofing is not approved, the association is tackling the problem in a sincere effort to learn how to overcome the hurdles as economically as possible.

Four heating systems will be tested during the coming winter season, including a warm air radiant convection system with ducts embedded in the concrete slab along its outer perimeter, a gravity warm air system with high side wall registers and low wall returns, a forced air system using the same ductwork as the gravity system, and a winter air-conditioning plant using low wall registers in each room and high side wall returns.

Ebasco Opens Chicago Branch

A Chicago office has been opened by Ebasco Services Inc., T. C. Wescott, president, announced recently. Rolland H. Bradford, a veteran of 20 years with Ebasco, will manage the office, which is located at 209 S. LaSalle St.

One-Day Strike Forces Milwaukee Pay Boost

Gas service to 210,000 customers in the greater Milwaukee area, which was shut off Oct. 5, was resumed 25 hours later when a strike of the CIO gas, coke and chemical workers was resolved after an all-night bargaining session.

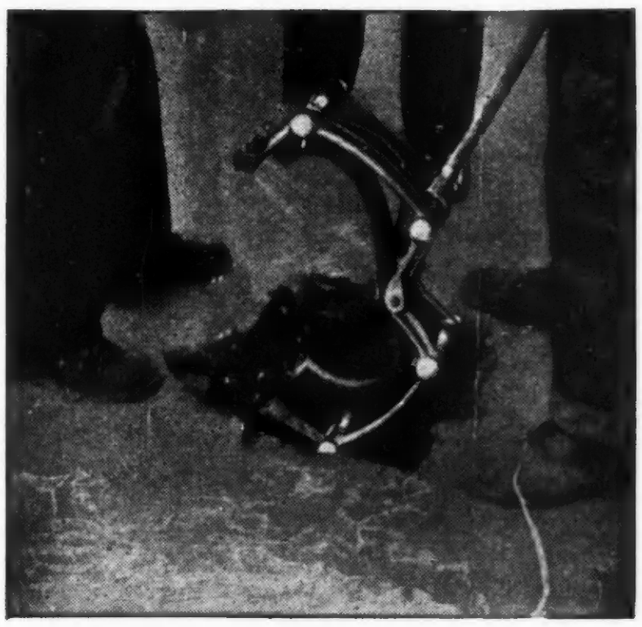
Although resumption of normal gas service was expected to require several days, partial service was resumed almost immediate-

A SIMPLE SOLUTION for one of the GAS INDUSTRY'S *most trying problems*

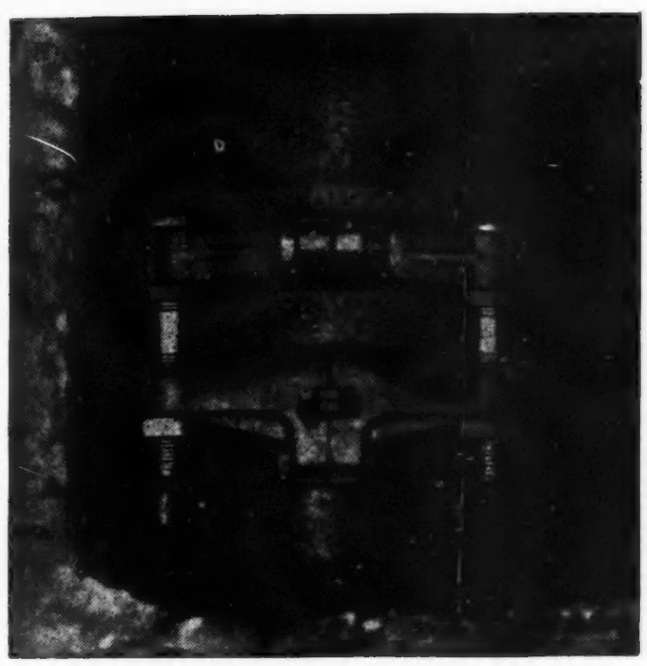
the NORMAC BELL JOINT CLAMP

SOLVES YOUR JOINT REPAIR PROBLEMS

QUICK • EASY • PERMANENT



6 inch Normac Clamp being lowered into hole for installation



6 inch Normac Clamp in service after installation

Installed in small pavement openings. Available in all standard sizes from 3" to 12". A simple set of tools cleans the joint, installs the clamp . . . often in only a quarter of an hour. SAVES TIME. SAVES MONEY and the repair is permanent. Designed for all conditions particularly where pavement repair costs are prohibitive. Such small opening repairs are scarcely noticeable when pavement is replaced.

Normac Clamps can be installed in large as well as small openings.

Norton - McMurray hold definite leadership in the development of methods for installation and rehabilitation work through small openings. We welcome the opportunity to help solve a problem you may have—tell us about it.

Write for our catalog describing our complete line of COUPLINGS . . . FITTINGS . . . SERVICE TEES and ELLS . . . SLEEVES . . . COMPRESSION-END COCKS . . . METER BARS and BRASS FITTINGS for copper pipe.

NORTON-McMURRAY MFG. CO.

39 SOUTH LA SALLE ST. • CHICAGO 3, ILL.

Method and product covered by U. S. Patents, Nos. 2,163,261 and 2,178,286.

ly. A temporary restricting order which the Wisconsin Employment Board issued was ignored by the employees who struck.

A 5-cent hourly across-the-board increase, retroactive to June 1, plus shift pay differentials and a contributory pension plan were agreed to by the company in order to settle the strike.

Folks Like Oil Industry

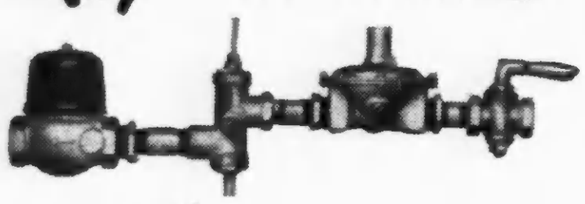
Sometimes it is progressive just to stand still, according to the Oil Industry Information Committee. A new national survey of public opinion recently completed revealed that, on the whole, the oil industry appears to stand about the same in public favor as it did in 1946, which is considered a creditable performance because of the increase of public antagonism to business in general over the past three years.

The study, conducted by Opinion Research Corp., shows as did the 1946 survey that the more people know about the oil industry, the better they like it. When asked to choose from eight adjectives the two or three they think best describe the industry, 65% of the people selected "progressive" and 36% selected "public spirited," while less than 25% chose unfavorable terms.

In general, most people think the industry does as well or better than other industries in improving its products. All in all, the report was considered highly favorable.

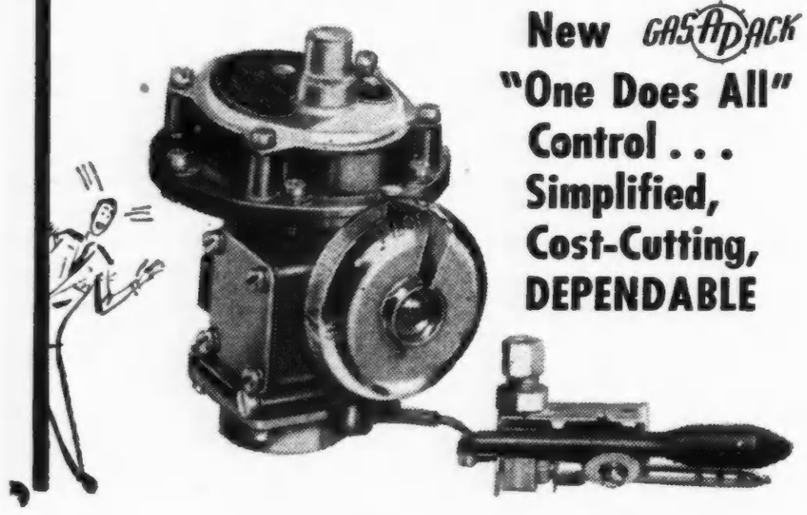
Want to Cut Gas Heater Costs and BOOST SALES...

Replace This



Present Multiple Assembly of up to Five Separate Gas Control Units

With THIS



New GASAPACK "One Does All" Control . . . Simplified, Cost-Cutting, DEPENDABLE

New GASAPACK Revolutionizes Gas Control in Circulating Heaters!

Actually, the new A-P GASAPACK eliminates all piping in your heater! Even the burner spud is an integral part. You tighten only 2 screws on a bracket to mount the GASAPACK. Then it's ready to connect to gas main. Every other control function is built in — pressure regulator, solenoid, filter, A-cock, B-cock. Takes less room than ONE of these separate units — only 5½" x 5½" x 3⅞".

New GASAPACK Model 54 "One Does All" Gas Control Features:

- 100% FAIL SAFE OPERATION
- 100% SAFE LIGHTING
- 100% SHUT OFF SAFETY
- 100% AUTOMATIC CONVENIENCE
- Only ONE Unit to Buy, Stock, Install
- Cuts Factory Assembly Time
- Simplifies Field Installation
- Saves Gas Control Costs
- Operates Quietly
- Helps You to Better Styling
- Provides Proven DEPENDABILITY
- A.G.A. Approved
- Capacity
  70,000 B.T.U. on gases less than 800 B.T.U. per cu. ft.
  100,000 B.T.U. on gases more than 800 B.T.U. per cu. ft.

GASAPACK AUTOMATIC TEMPERATURE CONTROL

Thermostatic Control "kit," easy to add in the field, includes: Automatic Electric Top, Low Voltage Thermostat, Transformer and all fittings. Provides the last word in heating convenience with your heater.

AUTOMATIC PRODUCTS COMPANY
2526 NORTH THIRTY-SECOND STREET
MILWAUKEE 10, WISCONSIN

WRITE for the whole profitable story of A-P GASAPACK, the "ONE DOES ALL" Gas Control for today's and tomorrow's finest gas heating appliances.

Millions Know the Satisfaction of
DEPENDABLE Controls
FOR HEATING . . . AIR CONDITIONING . . . REFRIGERATION

FINANCIAL

PG&E Wins Rate Boost

Partial rate relief was won last month by Pacific Gas & Electric Co., San Francisco, in its application for new tariffs submitted to the California Public Utilities Commission. As a result of the year-long proceedings, the company won 42% of what it estimated it needed as additional income. The commission earlier this year had denied an interim rate increase.

PG&E had sought a 6% return on its electric department rate base and 6.5% on its gas department, but the commission allowed only 5.9% on the gas department. The resulting increase in income will amount to about $4 million as against $9.5 million sought. The commission took cognizance of the company's need to cut down its debt ratio to 57% through equity financing.

Simultaneously, in Los Angeles the commission began hearings on Southern California Gas Co.'s request for rate increases. SoCal, which was asking its first boost in 30 years, estimated its needs at an additional $16.7 million in annual gross revenues. The company wants 6¼% rate of return. President F. S. Wade said that the rate for 1949 on a normalized basis has sunk to a dangerously low 2.6%. Like PG&E, SoCal needs a realignment of equity and debt ratios.

Other rate developments included these:

In Washington, D.C., hearings, the Washington Gas Light Co.'s application for a 7.36% rate increase ended last month. The long drawn out proceedings were marked by bitter charges and counter-charges by district gas consumers and independent dealers who were trying to stymie the company's application. A decision from the public utilities commission was expected by Nov. 1. The utility ran into difficulties in attempting to set a scientific rate boost which would be fair to all classes of consumers.

Operating Revenue on Upgrade

An increase of 8.9% over operating revenues in July 1948 was chalked up by natural gas companies in July 1949, according to the Federal Power Commission. Comparative figures were $56 million for 1948 and $61 million for this year's month.

Gas utility operating income, however, was down 20% from almost $7 million to $5.5 million.

Operating revenue deductions, including operating expenses and depreciation, showed sizable gains, while taxes dropped 14.6%. Gas sales to ultimate consumers were up 3.2% to a total of 109,418 MMcf. Likewise, revenues from sales to ultimate consumers jumped 3.6%.

Rockwell Wins Oscar

The Rockwell Manufacturing Co., Pittsburgh, has won the bronze Oscar of Industry trophy for having the best 1948 annual report in the metal products industry. Recognition was made at *Financial World's* annual awards banquet at the Hotel Statler in New York on Oct. 31.

Blaw-Knox Co., Pittsburgh, was runner-up for top honors in the metal products classifica-

tion. More than 4500 annual reports were submitted in this, the ninth national survey.

Weston Smith, executive vice president of *Financial World,* made the presentation to W. F. Rockwell Jr., president of the company.

Toronto Snubs Devaluation

Devaluation of the Canadian dollar will not immediately affect the consumer price of illuminating gas, according to E. J. Tucker of the Consumers Gas Co., Toronto, Ont.

"We use 300,000 tons of coal a year to manufacture gas," said Mr. Tucker, "and basing this on a year's operation it would mean an added expense of $270,000. But we have sufficient coal to last us until April 1, and so far, we have not considered possibility of price increases."

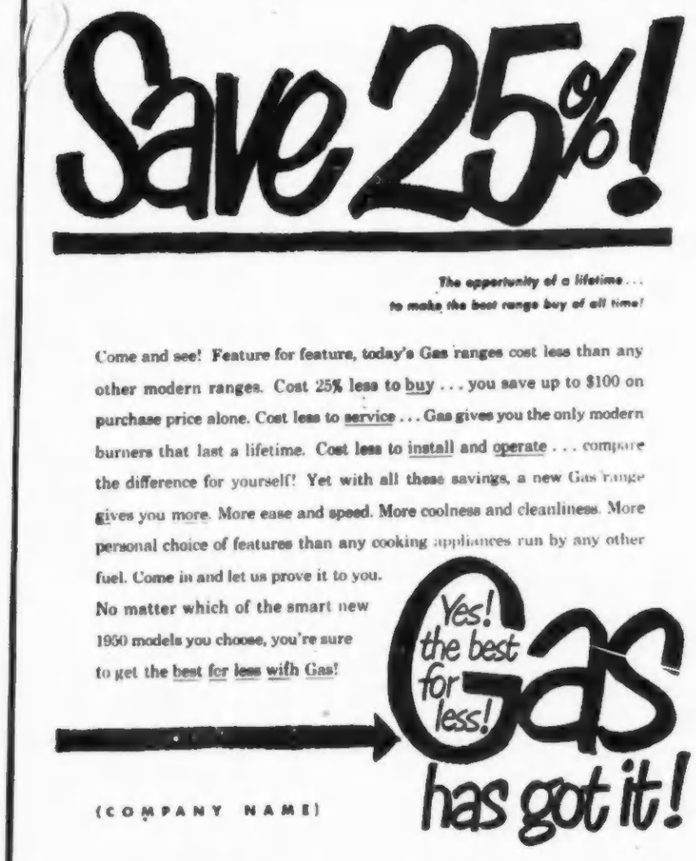
PG&E Wins Rate Relief

In Trenton the public utilities commission denied the application of Jersey Central Power & Light Co. for an increase from $1.05 to $1.50 as minimum monthly charge. The commission said that the company had applied for the new increase without waiting a reasonable length of time to see how current revenues would affect it. Furthermore, the financial condition of the company will be improved next year when natural gas is received from Texas, the commission decided.

Revised Tariffs Accepted

Revised rate schedules submitted by Kentucky West Virginia Gas Co., which would reduce its annual rates for gas sold to Pittsburgh & West Virginia Gas Co. by $317,000 and to Louisville Gas & Electric Co. by $105,000, have been accepted for filing by the Federal Power Commission.

The new schedules were submitted in compliance with a commission order of last June to reduce its rates to the two distributors. The rate proceeding was instituted in 1945 after the city of Pitsburgh complained about high rates.


Save 25%!
The opportunity of a lifetime . . .
to make the best range buy of all time!
Come and see! Feature for feature, today's Gas ranges cost less than any other modern ranges. Cost 25% less to buy . . . you save up to $100 on purchase price alone. Cost less to service . . . Gas gives you the only modern burners that last a lifetime. Cost less to install and operate . . . compare the difference for yourself! Yet with all these savings, a new Gas range gives you more. More ease and speed. More coolness and cleanliness. More personal choice of features than any cooking appliances run by any other fuel. Come in and let us prove it to you.
No matter which of the smart new 1950 models you choose, you're sure to get the best for less with Gas!
Yes! the best for less! Gas has got it!
(COMPANY NAME)

Economy is the theme of AGA range advertising for fall months. "Feature for feature (they) cost less to buy," copy points out.

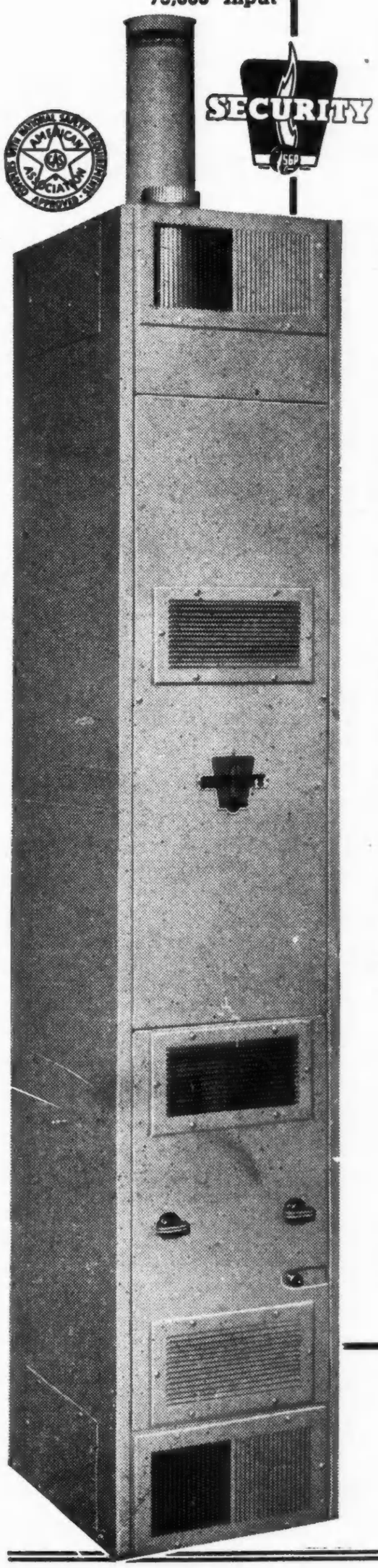
Old Stove Roundup's Effects Felt as Range Shipments Jump

Evidence that the Old Stove Roundup is beginning to pay dividends has begun piling up in the AGA statistical department. In a reversal of previous monthly trends, gas range shipments in August jumped 64% over July's shipments, the AGA reports.

Based on GAMA surveys, the totals show 187,000 units in August as compared with 113,900 in July. Although traditionally sales bounce back from the mid-summer low, the increase this year is reported to be three times the usual rate. It was reported further that competitive range sales failed to keep pace with the gas industry's gains.

The Old Stove Roundup began Aug. 1.

Meanwhile, GAMA released statements which proved that in the month of July no categories except gas range shipments were substantially higher than a year ago. Shipments of gas-fired furnaces were up 30% over July 1948; gas conversion burners were up 410%; gas-fired boilers, which during the first half of the year had been leading the parade, were up 39.7%; and gas-fired floor furnaces jumped 28% over June. Gas-fired water heaters also showed a drop of 9.9% from July 1948.



NOW...

a TRULY Forced Air

INN-A-WALL

...and you can employ duct work where necessary!

YES, sir . . . here is *the* answer to heating properly small homes without basements. Security's INN-A-WALL is an entirely new principle in forced air heating! Requires minimum duct work . . . may be used without ducts. Needs only 16 by 20-inch floor area.

The INN-A-WALL reverses the usual flow pattern . . . warm air comes out the *bottom*. This means *warm floors!* Warm air can be taken from all four sides . . . return air, from all sides at the top. Where ducts are required for distant rooms, permanent connection is made at the bottom. Completely assembled . . . ready to install. Casing height, 88 inches. Security breather tube automatically supplies air for combustion.

Other outstanding INN-A-WALL values are • Quiet positive blower • Fully automatic • Special Security high-efficiency burners • Complete adaptability to any floor plan (may be placed in wall or stand alone) • Amazingly economical in price.

SECURITY

Automatic, Gas-Fired

INN-A-WALL FURNACE

Write Today . . . don't delay. Get all the facts about this revolutionary new furnace.

SECURITY MANUFACTURING CO.

1630 OAKLAND STREET • KANSAS CITY 3, MISSOURI

Southern Union Takes Over Albuquerque System

Southern Union Gas Co., Dallas, took over the distribution system in the city of Albuquerque, N. M., on Sept. 30, thereby consummating the company's purchase of the natural gas distribution facilities from Public Service Co. of New Mexico.

As of that date 24,000 customers who had received Southern Union Gas through Public Service Co.'s mains began receiving the gas direct from the Dallas firm. Since 1930 Southern Union has owned the gas distribution franchise in Albuquerque which it had assigned to Public Service.

Addition of the $4 million property boosted Southern Union's natural gas consumers to 160,000 scattered through 42 towns and cities in Texas, New Mexico and Colorado.

Gas department employees of Public Service Co. were "acquired" in the transaction. Tom Corr, northwestern New Mexico district manager for Southern Union, moved from Santa Fe to Albuquerque to take over general supervision of operations there. He will be assisted by T. A. Wilson, Farmington, N. M., formerly Southern Union production and transmission superintendent.

Hope Wants Rate Relief

"Substantial increase in cost of operations" during 1947 and 1948, heightened by substantial decreases in the market price of hydrocarbon by-products, has placed Hope Natural Gas Co., Clarksburg, W. Va., in the position of seeking a boost in wholesale natural gas rates.

In its application to FPC, Hope estimated the proposed schedules would bring an increase in revenues of $2.1 million annually for the period Nov. 1, 1949, to Oct. 31, 1950. Five companies supplied by Hope which would be affected are East Ohio, Cleveland; Peoples Natural, Pittsburgh; New York State Natural, Pittsburgh; Manufacturers Light & Heat, Pittsburgh; and Mount Morris (Pa.) Gas Co.

Atlantic City Boost Denied

Because it claims that production expenses are currently at lower levels than when present rates became effective more than a year ago and because the company is planning additional reductions in operating expenses by replacing manufactured gas with natural gas, the New Jersey Board of Public Utilities Commissioners has denied a request of the South Jersey Gas Co. to increase its rates.

The increase, according to the commission, would have added 33 cents to the average monthly bill in Glassboro and 40 cents to bills of Atlantic City customers. The company said the boost was needed to offset increased operation and to improve the present low rate of return.

United Rate Cases Lumped

Ammunition was added to FPC's attack on United Gas Pipe Line Co.'s rates last month when a proceeding involving Willmut Gas & Oil Co.'s complaint against the pipeline company was consolidated with the commission's current investigation of United's general rate structure.

Willmut, located in Hattiesburg, Miss., alleges that United's rates for gas sold at wholesale are too high. The commission has been investigating the overall rate structure of United for the past year.

Heating Rate Up, Cooking Down

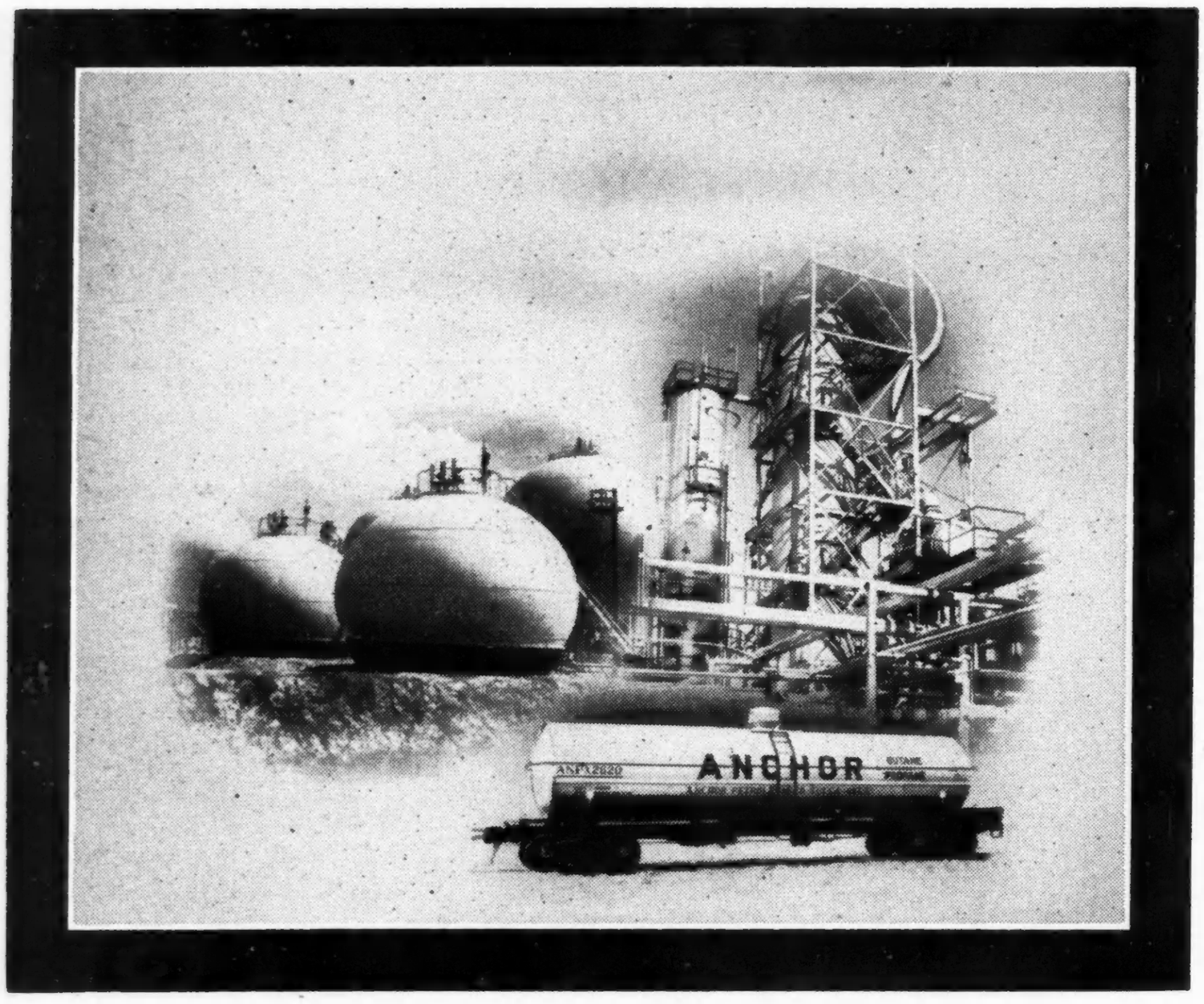
In Burlington, Wisconsin Southern Gas Co. has succeeded in revising its rate schedules in accordance with present day theory. New rates which went into effect Sept. 23, as ordered by the Wisconsin Public Service Commission, reduced the cost of natural gas served for cooking, refrigeration, and water heating.

According to President K. D. Knoblock, a rate increase was made in the heating category only, a move which will place the cost of additional peak load construction where it rightly belongs.

CIG Rate Query Reopened

The drawn-out investigation of Colorado Interstate Gas Co.'s rates reopened Oct. 20 in Washington, D.C., when oral argument was begun. The commission suspended the Colorado Springs pipeline company's tariff last May pending hearings which were subsequently held in Denver.

In September an initial decision was rendered ordering one volume accepted for filing but ordering the company to refile the second volume.



call anchor first

LP-Gas for: Stand-by Plants - Peak-load Demands - Industrial Plants - Cities and Towns

From our strategically-located plants we are able to give quick delivery on high-quality ANCHORGAS, Butane-Propane. Shipments by rail, water, or transport. For dependable gas service, call us before you renew your contract. Ask about Anchor's special contract.

ANCHOR PETROLEUM COMPANY

Atlas Life Bldg. Tulsa, Oklahoma

SALES SLANTS

Calapco Gets "Back in Action" Promotionwise

After nearly eight years of "relative inactivity," Central Arizona Light & Power, Phoenix, is jumping back into the field of aggressive sales promotion—with both feet.

"Back in Action," theme of the 1949-50 campaign, means the company is going to help gas and electric dealers in its territory snag a big share of the estimated $9,692,000 appliance market. Calapco is shunning full scale appliance merchandising itself, except on lines of appliances and equipment that "may not be profitably and aggressively sold by dealer organizations." Advertising is being keyed to this idea, directing prospective customers to "your favorite appliance dealer."

The company has set up a 9-point plan of action to aid dealers:

1. Prospect development. A company-maintained customer record file will provide dealers with hot leads. Yearly calls will be made on gas and electricity users for the purpose of surveying present equipment and talking up modern appliances. Calapco's 1300 employees have been enlisted to turn in prospect cards.

2. Home service. Appliance demonstrations on dealer sales floors, free home demonstrations of major appliances, cooking schools, and homemaking and cooking classes are programmed.

3. Displays. Distributors may sponsor displays on Calapco district office sales floors.

4. Dealer sales training. Fundamental sales training, refreshers, and manufacturers' previews of new appliances will be held.

5. Sales manual. Free to dealers, this will contain data on wiring, gas piping, sizing, operating cost analyses, installation, and sales pointers.

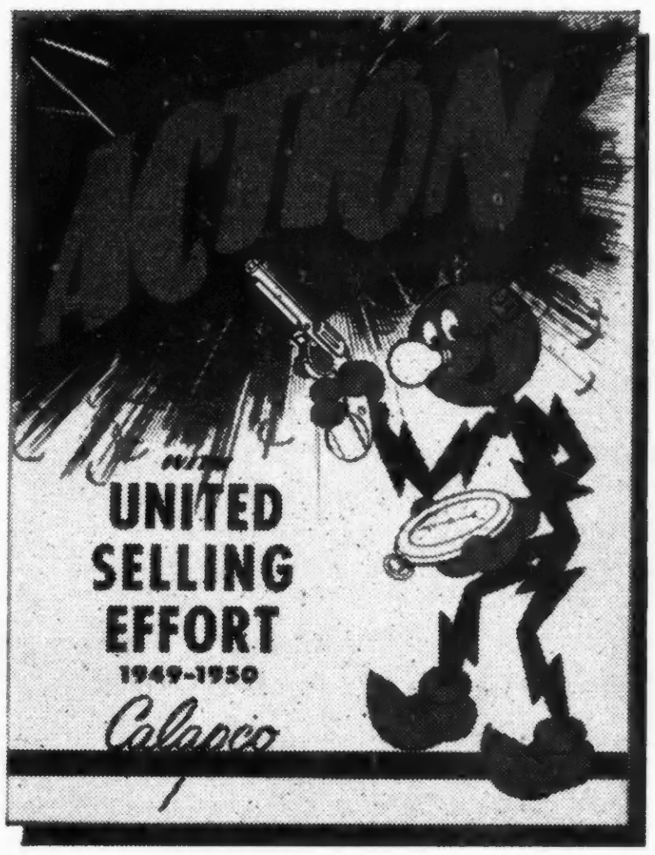
6. Monthly sales bulletin. Issued by Calapco, it will detail previous month's appliance sales, broken down by appliance; news of service extensions planned for immediate future, sales tips and helps.

7. Dealer sales meetings. At the start of campaign, meetings will be held to advise dealers and aid them in planning campaign strategy. Special meetings will feature control experts.

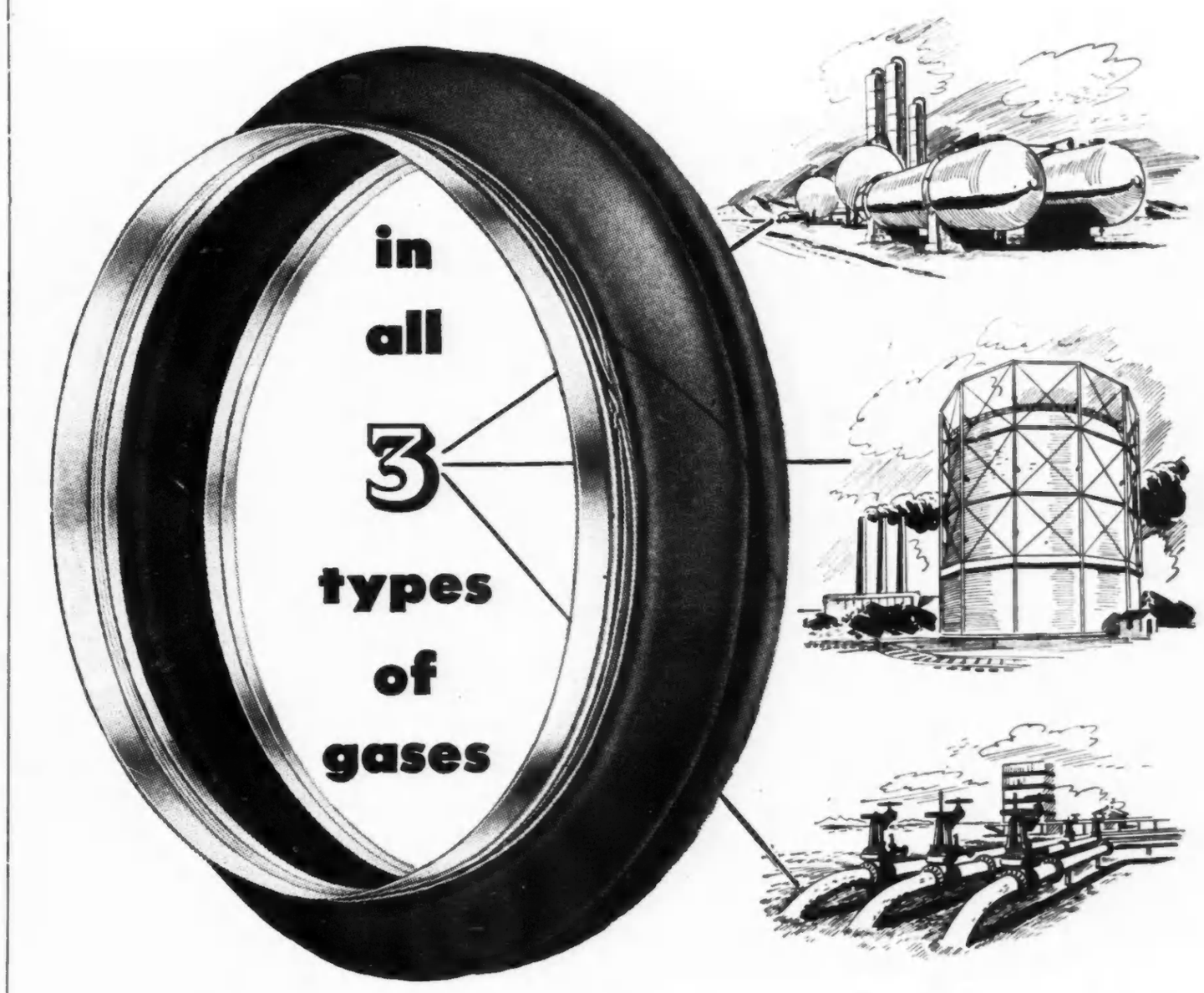
8. Special dealer tie-in material. Free point-of-sale materials will be provided cooperating dealers.

9. Advertising. Extensive and intensive, it will stress "See Your Favorite Dealer."

Calapco employee participation in the program will consist of turning in leads for transmittal to dealers; each appliance sold as a result of these leads will give credit points to the employee responsible. Points range from 50 to 200, depending upon the appliance sold; for example, gas ranges are worth 100, water heaters 150, electric ranges or water heaters, 200; gas or electric clothes dryers 50, refrigerators 100; television sets, 50. A typical prize,



Theme of Central Arizona Light & Power's re-entry into active appliance sales promotion is embodied in the cover from the dealer sales program booklet.



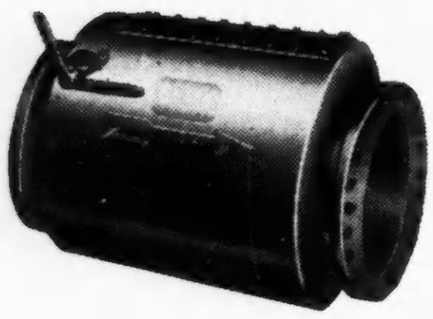
Vulcan Diaphragms Excel!

Whether the gas is manufactured, natural or L.P., VULCAN Diaphragms for meters and regulators give outstanding performance.

The VULCAN Molded Loop is streamlined, smooth and perfectly balanced, free from irregularities of shape. Because of vulcanizing to the rings, plus fastening with special wire, tie leaks are virtually impossible.

VULCAN Diaphragms remain pliant and flexible, with no need for oiling. They do not dry out and become brittle, and successfully withstand the drying effects of both natural and L.P. gases. For more accurate metering, follow the lead of engineers everywhere. Specify VULCAN Diaphragms.

Vulcan
PROOFING COMPANY
FIRST AVENUE & 58th STREET • BROOKLYN 20, NEW YORK



NORWALK
DISC TYPE
CHECK VALVE

Flanged and
Fabricated in Steel

For *GAS* and *AIR*—
LOW and *HIGH PRESSURES*

Can be supplied for use with any pressures. Easily lubricated through grease fitting. Indicator shows position of disc. Can be counter balanced for vertical jobs. Dash pot can be installed to prevent chattering when passing high velocity gas or air.

NORWALK VALVE CO.
South Norwalk, Conn.

MANUFACTURERS LIGHT & HEAT CO. cooperated with The Peoples Natural Gas Co. and Equitable Gas Co., all of Pittsburgh, in making this gas appliance display at the Allegheny county free fair a promotional success. Thousands of Pittsburgh-area residents were invited to come in for a drink of cold water, sit down and rest. Sales representatives of the three companies were on hand to tell why Gas Has Got It and to distribute descriptive literature.

a pressure cooker, requires 1730 points.

Being a combination company, Calapco kept out of the appliance market during the period of scarcity.

Tremendous population growth in the area the company serves—Phoenix alone jumped from 125,000 in June 1941 to 232,000 in June 1949—has been reflected in customers growth from 31,000 to 62,000 electrical and 18,000 to 48,000 gas. Anticipating further increases in 1949-50 of 7785 on electrical lines and 10,705 on gas lines, the company has set up campaign quotas on the basis of Mcf's and kw's.

Promotion on the majority of appliances will be keyed to seasonal demand.

A. O. SMITH CORP.'S new product service division plant in Dallas, which features 24-hr, off-the-shelf replacements on water heaters, pumps, meters, and liquid gas systems, held open house in September. The Dallas plant is the fourth branch to be opened by the division, which has headquarters in Chicago and other plants in Union, N. J., and Los Angeles.

The division plants, under the direction of J. J. Bohmrich, also do repair work by line production methods, help dealers and distributors in sales and service meetings, provide service training, make field studies, and do extensive testing.

D. R. Neff heads the Dallas office.

MINNEAPOLIS - HONEYWELL REGULATOR CO. is offering its dealers an exchange plan for replacement of three old style Chronotherm thermostats still in use. List price for repairing the old models is the same as the home owner's cost on an exchange for a new one, plus $1 federal tax. To simplify the exchange, dealers can stock a package containing the new Chronotherm, mounting plate assembly, and instructions. A new transformer is not required. National advertising by the manufacturer is currently promoting thermostat replacement.

LONE STAR GAS CO. Vice President Chester L. May has announced the details of a $6 million quota sales campaign to every employee of the company and urged each one to work for a share of the $21,000 prize money. Quotas for each division, district, and local group have been assigned in accordance with the meter count as of April 1949. Making or exceeding the quota is necessary to becoming eligible as a prize-winning group. A special air conditioning trophy has been added to general prize awards.

BOOMING SALES of Hamilton automatic clothes dryers have dictated the addition of a night shift on the company's production line. Current market factors indicate clothes dryer sales are fast approaching a new peak, according to H. G. Evans, vice president of Hamilton Manufacturing Co., Two Rivers, Wis.

STAMANCO EXPERT HOLDER INSPECTION

-Saves You Money!

Even though your gas holders have had regular attention from your company maintenance crew - it will pay you to have an occasional inspection by STAMANCO Inspection Specialists who are --

EXPERTS in the prevention of trouble development

EXPERTS in the detection of present troubles

EXPERTS on how to best repair damage done

STAMANCO Inspection Service can save you money by extending the life of your present holders....by reducing the possibility of shut-downs due to corrosion and mechanical troubles....by correcting factors which would eventually cause expensive major repairs. We shall be pleased to talk your holder maintenance problems over with you.

The STACEY MANUFACTURING Co.
SINCE 1851
CINCINNATI 16, OHIO
GAS HOLDERS • HI-PRESSURE TANKS • PURIFIER BOXES
ENGINEERS • FABRICATORS • CONSTRUCTORS
An Independent Organization Not Affiliated With Any Other Builders of Gas Holders

IN ORDER TO PREPARE the heating trades for the large heating demands expected in conjunction with the arrival of natural gas in St. Paul, Minn., J. H. Fagan Co. and Roberts - Gordon Appliance Corp. recently sponsored a dealer school in the city. More than 500 persons attended.

The school was conceived to give dealers and installers the training necessary to comply with a new gas space heating ordinance passed by the city council in August under which installers' licenses are required. Four meetings were organized by the sponsors with the support of city and union officials, as well as school officials of the St. Paul Vocational School where the meetings were held.

Robert Warnecke, chief engineer of Roberts-Gordon, conducted the courses.

GEORGE D. ROPER CORP., Rockford, Ill., which is one of the pioneers in television shows on the west coast, reports outstanding success with a special August promotion which featured a contest in which the entire price of a Roper range was refunded to a purchaser. Mrs. E. Selzer of Los Angeles won the prize—$344, the exact cost of her new range. Radio and newspaper promotion was tied in on the campaign.

IN RECOGNITION of the use of its brand name, "Florence," for 75 years, Florence Stove Co., Gardner, Mass., was awarded the Brand Names Foundation's certificate of public service at a recent dinner at Worcester, Mass. Walter F. Muhlbach, director of marketing research, accepted the award which was presented by Frank Kibbey of the Coca-Cola Co.

PEOPLE

James G. McKee

JAMES G. McKEE has joined the industrial engineering staff of The Manufacturers Light & Heat Co., Pittsburgh. Mr. McKee received oil and gas industry training at the University of Tulsa and was graduated from Geneva College, Beaver Falls, Pa., as an industrial engineer. He is receiving specialized training in indusrial gas applications at the company's general offices and will be assigned a territory in the near future.

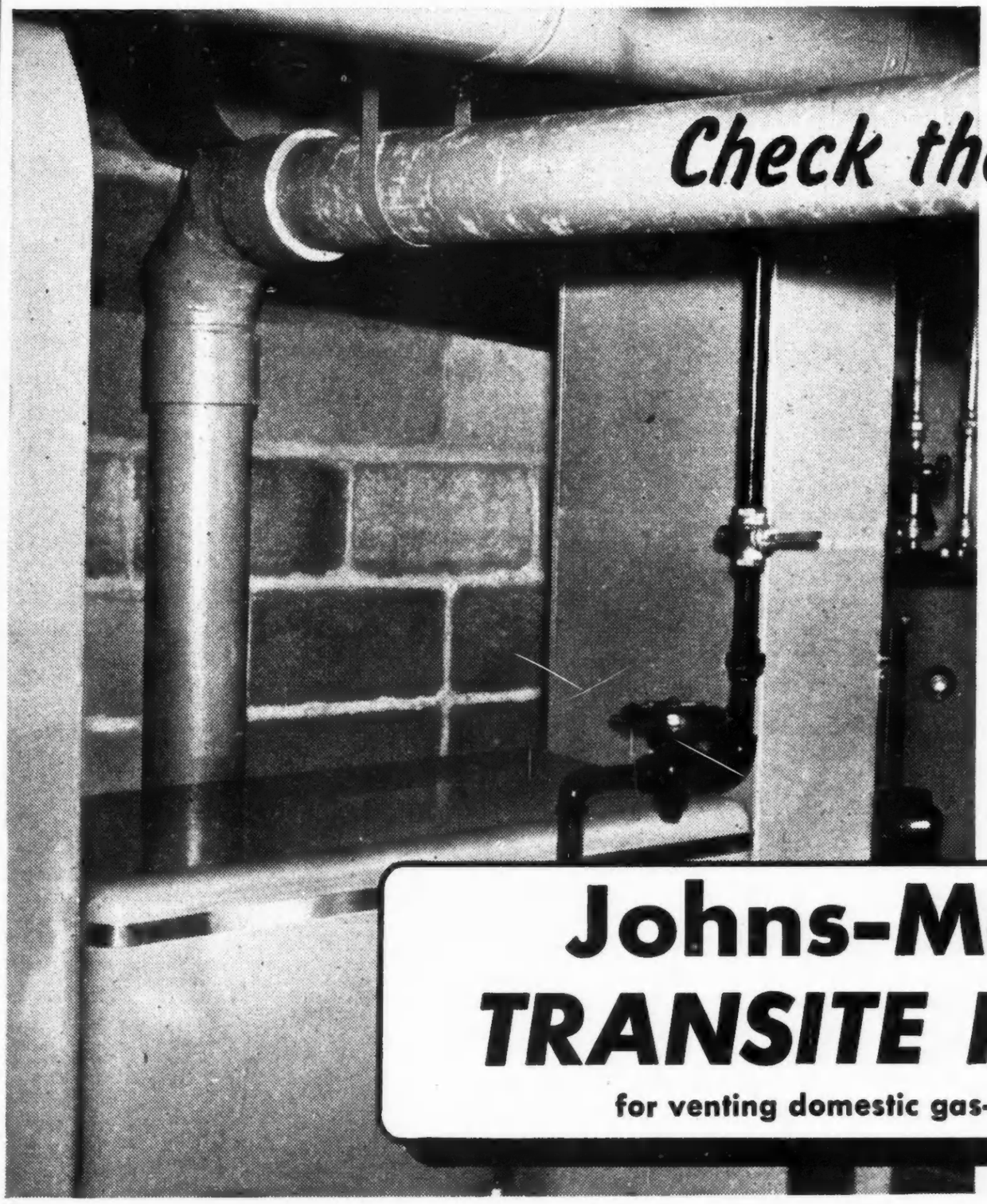
J. T. VAN RENSSELAER, former editor of publications for Southern California Gas Co., Los Angeles, recently was placed in charge of the utility's newly named "news and publications" office. Some months ago press and publicity duties, which had been handled by OTTO MAUTHE, were reassigned because of Mr. Mauthe's protracted illness. Mr. Van Rensselaer's appointment terminates the temporary arrangement.

R. A. GOPEL has been named manager of sales training for Koppers Co. Inc., Pittsburgh, and T. H. CABLE has been added to the company's sales department. Mr. Gopel had been district merchandise manager in Baltimore for Westinghouse Electric Supply Co., and Mr. Cable was eastern advertising manager for Westinghouse Electric Corp. for the past three years.

FREDERIC J. PORTER JR. has been appointed commercial manager in charge of customer relations and staff operations of the commercial relations department, Consolidated Edison Co. of New York Inc. The new position of assistant general commercial manager has been filled by JOHN J. McNAMARA and C. L. HAVENER has been appointed manager of the Brooklyn retail accounts, also a new position. All three men were promoted from other ConEd posts.

WILLIAM W. MAYFIELD has been appointed superintendent of production and distribution in charge of field operating divisions, leasing and geology, at Hope Natural Gas Co., Clarksburg, W. Va. A mechanical engineering graduate of Purdue (1933), Mr. Mayfield has been employed by Hope since 1934, with time out for naval duty from 1942 to 1945. He has been mechanical engineer, geologist, and production engineer at Hope.

HERBERT F. GOODENOUGH, who has been associated with The Refinery Supply Co. of Tulsa for 20 years, has announced the opening of an engineering service for gas measurement at 604 Burk Burnett Bldg., Fort Worth, Texas. His service will include meter testing, chart calculations, gas well testing, oil and gas ratio testing, and general gas testing. Mr. Goodenough has been engaged in gas measurement work since 1926.



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ASBESTOS-CEMENT
Flue Pipe gives you:

1. Can't rust
2. Tough and strong
3. Light in weight—easy to install
4. Low heat conductivity
5. Available in both round and oval shapes
6. A complete line of Transite* fittings

*Reg. U. S. Pat. Off.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville
TRANSITE FLUE PIPE
for venting domestic gas-burning appliances

M. H. Jackson
. . . Middle West

R. C. Anderson
. . . Bryant

J. H. Taussig Jr.
. . . Koppers Co.

W. E. Davis
. . . Roberts-Gordon

Ray McLean
. . . Jaeger

George S. Jones Jr.
. . . Servel

MAYNARD H .JACKSON has announced the opening of Middle West Coating & Supply at 807 Daniel Bldg, Tulsa, Okla. The company is offering a complete line of corrosion mitigation products to be used in protection of pipe and other metallic surfaces, including Koppers cold coatings, Oklahoma Glass Fiber reinforcement, pipeline felts, etc. Mr. Jackson spent 10 years with Johns-Manville, was midwest special representative for Hill Hubbell Co., and most recently was sales manager of Standard Pipeprotection Inc., St. Louis.

R. C. ANDERSON has been appointed the distributor for Bryant Heater Division of Affiliated Gas Equipment Inc. in the Houston territory. Formerly the southern district manager for A. O. Smith Corp., Mr. Anderson's organization, the Bryant Anderson Co., will be located at 3215 Locke Lane in Houston.

J. H. TAUSSIG JR., former assistant engineer of works for the Philadelphia Gas Works Co., has been named gas engineer for Koppers Co. Inc., Pittsburgh. Mr. Taussig will be located in the company's New York City sales office where he will work with W. Reed Morris, former vice president and general manager of Koppers' gas and coke division and the company's eastern representative, who was named the firm's consultant to the gas industry following his retirement from active management in August.

W. E. DAVIS has been appointed assistant general sales manager for The Roberts-Gordon Appliance Corp., Buffalo. Mr. Davis will assist L. C. Smyth, vice president and general sales manager, in working with distributors throughout the country. He held a number of positions, including assistant general sales manager, with Equitable Gas Co., Pittsburgh.

RAY McLEAN, executive vice president of The Jaeger Machine Co., Columbus, Ohio, for the past four years, was elected president at the firm's annual meeting Sept. 17. He succeeds O. G. MANDT, with whom he has shared executive responsibilities for some time because of Mr. Mandt's impaired health. Mr. McLean became associated with Jaeger in 1939 and became a vice president and director in 1942.

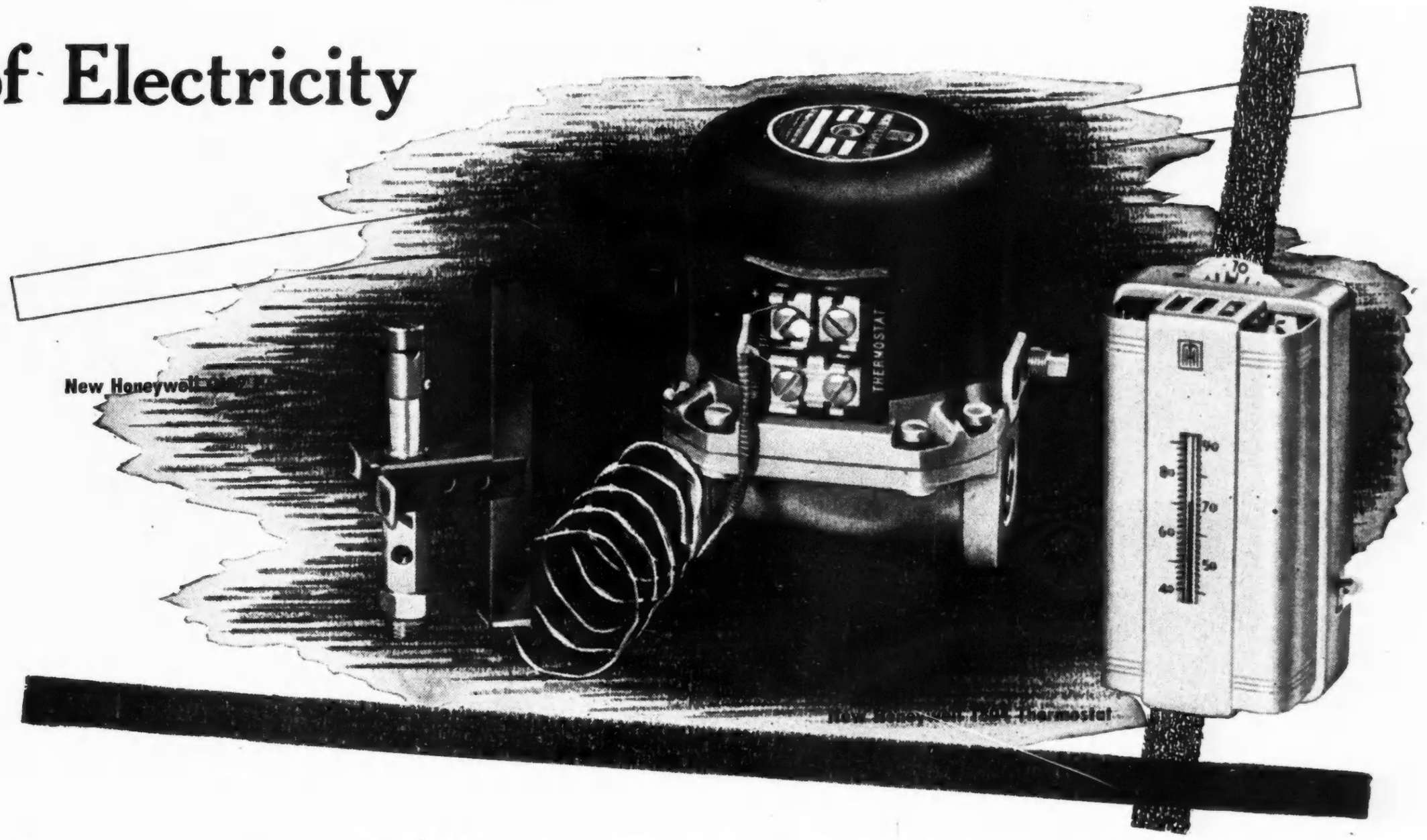
GEORGE S. JONES JR., vice president and assistant to the president of Servel Inc., Evansville, Ind., was recently named chairman of the National Distribution Council at a meeting in Washington, D.C. The council is the official advisory body to the Commerce department on selling, marketing, and distribution materials and is composed of past and present leaders of national organizations in the field of distribution.

RALPH McCUMBER and LEO EAST have been promoted to new positions with Roch-

ARCCO
BETA CHART PENS
...HOLD 2 to 4 TIMES MORE INK
Beta Fountain Pens hold two to four times the ink of ordinary chart inking pens. Regardless of the line thickness Beta Pens produce a smooth unbroken and uniform line. Pens shown are approximately actual size and can be arranged to reduce time interval between static and differential lines to only a few minutes. Beta Pens are especially suitable for seven day records. Price $1.00 (lower prices in quantities).
Send for bulletin No. 110.
AMERICAN
RECORDING CHART CO.
3113 E. 11th St. • Los Angeles 23, Calif.
Available for Early Delivery
SEND FOR BULLETIN No. 110

THE HONEYWELL POWERPILE*

New Self-Powered Gas Package Provides Fully Automatic Temperature Control . . . Requires No Outside Source of Electricity



THIS new gas package set gives fully automatic heating control without using any outside source of electricity. It uses Honeywell's newly developed Q182 *Powerpile,* which generates sufficient electrical current to operate the control system. The *Powerpile* consists of multiple thermocouple elements which generate electrical energy through the temperature difference between the Powerpile tip (which is placed directly into the pilot flame), and the cooler end, which is away from the flame. Should the pilot flame fail, the control system becomes de-energized, and the gas control valve closes, thus eliminating the need for additional safety pilot.

Ingenious application of the polarized relay principle in the diaphragm actuator makes available the maximum of energy, insuring positive operation of the valve mechanism. All electrical parts are out of the gas stream, assuring long life and dependable operation.

This system features the new T804 Thermostat, designed with a special mercury switch for use on extremely low current circuits. For another industry "first", Honeywell presents a thermostat which will improve comfort by heat leveling—without using an external source of electric current.

* Trade Mark

MINNEAPOLIS **Honeywell** CONTROL SYSTEMS

73 BRANCHES FROM COAST TO COAST WITH SUBSIDIARY COMPANIES IN: TORONTO • LONDON • STOCKHOLM • AMSTERDAM • BRUSSELS • ZURICH • MEXICO CITY

ester (N.Y.) Gas & Electric Corp. and both have been appointed members of the company's management council. Mr. McCumber, who has been general superintendent of the electric department, is now general manager of all electric and steam operations. Mr. East has been named general manager of gas and engineering operations, and his department includes engineering and purchasing. He was formerly general superintendent of gas operations.

A. H. Burchfield Jr.

ALBERT HORNE BURCHFIELD JR., president and general manager of Joseph Horne Co., Pittsburgh, was elected a director of Consolidated Natural Gas Co. at a board meeting held Oct. 5. Mr. Burchfield, who also serves as chairman of the board for the Pittsburgh branch of the Cleveland Federal Reserve Bank, succeeded J. D. BERG, the late chief executive officer of Dravo Corp., as a Consolidated director.

DUDLEY B. BROWN, a director of American Natural Gas Co., has been appointed vice president, director and assistant to the president of Milwaukee Gas Light Co. American Natural is Milwaukee's parent company. Mr. Brown has been added to the Wisconsin utility's executive staff because of the changeover from manufactured to natural gas which is currently under way. He has studied many phases of natural gas distribution in Detroit where he has been associated with American Natural since 1938.

GEORGE R. STEERE has been appointed a sales engineer by Semet-Solvay Engineering Division, Allied Chemical & Dye Corp., New York City. He will serve principally in the New England territory and will promote the firm's regenerative reverse flow of oil gas process.

PAUL C. GRIMES recently was named sales manager for The G. S. Blodgett Co. Inc., Burlington, Vt. In 1939 Mr. Grimes joined the company as assistant field representative in the New England area. After serving in the Army for four years, he was appointed Midwest representative for Blodgett, operating out of Chicago. He is now located in New York City.

G. VICTOR MARS, former sales manager of Ansul Chemical Co.'s industrial chemical division (Marinette, Wis.), has been named manager of the company's new product department. ROBERT J. YAEGER has succeeded him. Mr. Mars will coordinate new product and development work which, until now, has been performed by various departments.

GERALD F. TWIST has been appointed by Food Machinery & Chemical Corp., San Jose, Calif., as manager of the firm's Peerless Pump Division with headquarters in Los Angeles. Mr. Twist succeeded FRANCIS F. FAIRMAN JR. on Sept. 1.

J. P. CONNOLLY, sales promotion manager of South Carolina Power Co., Charleston, was presented with a certificate making him an honorary life member of the Southern Gas Assn. on Sept. 12, more than 20 years after he had been named the first such honorary member on April 25, 1929. At that time certificates were not issued. Only four additional honorary life memberships have been awarded. Mr. Connolly, who has held nearly every position a gasman can handle, joined the utility in 1911 and became an SGA member in 1912.

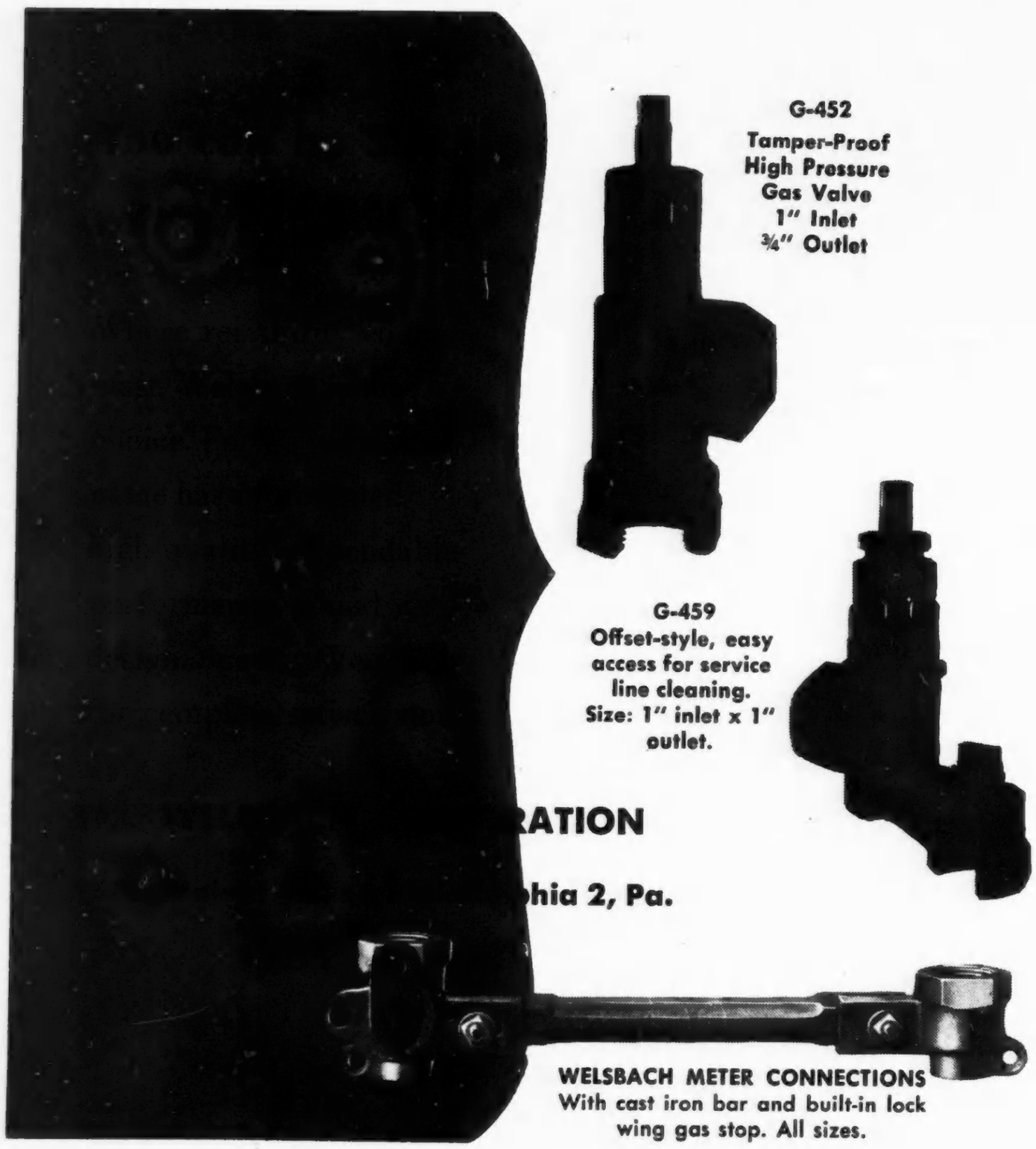
A. H. FORMAN JR., recently appointed assistant to the president of Central Arizona Light & Power Co., Phoenix, took over his new duties Sept. 13. Mr. Forman had been associated with the Mississippi Power & Light Co., Jackson, since 1929, most recently as assistant to the vice president.

LLOYD C. GINN, whose resignation as manager of the advertising and sales promotion department and board member of American Stove Co., St. Louis, was announced in October *GAS* (page 72), has been named general sales manager for Western Stove Co., Culver City, Calif.

HENRY OBERMEYER, director of advertising of the Consolidated Edison Co. of New York Inc., resigned recently to become vice president of Bozell & Jacobs Inc., Omaha advertising agency. Mr. Obermeyer will have offices in New York City. Beginning his utility career as editor of the *AGA Monthly*, he joined Consolidated Gas Co. in 1926 and became assistant vice president when the electric and gas companies were merged to form ConEd. As chairman of the AGA publicity and advertising section, Mr. Obermeyer laid the groundwork for the association's national advertising program.

Henry Obermeyer

LOVETT C. PETERS, former assistant treasurer of Bankers Trust Co. of New York, has been elected financial vice president of Laclede Gas Light Co., St. Louis. He took over his new duties Sept. 26 . . . CHARLES E. BENNETT, president of The Manufacturers Light & Heat Co., Pittsburgh, served as chairman of the utilities section of the Allegheny county committee which developed local plans for the 1949 Pennsylvania Week celebration held last month. W. L. HUTCHESON, sales manager of the company, was a member of Mr. Bennett's group . . . ROBERT E. WILLIAMS, district manager of the Binghamton (N.Y.) Gas Works, recently was elected to the board of directors of the Binghamton Chamber of Commerce . . . JOSEPH M. BELL JR., president of the New York State Electric & Gas Corp., Ithaca, has been elected to the board of directors of the Security Mutual Life Insurance Co., Binghamton . . . WILLIAM I. MYERS, dean of the New York State College of Agriculture at Cornell university, is a newly elected member of the board of New York State Electric & Gas, succeeding ALBERT F. TEGEN, who resigned.



Best looking Best cooking

BEST SELLING

GAS RANGES

Model No. 7476-2

These features make this range a MUST for your sales floor.

LIFETIME BURNERS
Guaranteed for life to original purchaser.

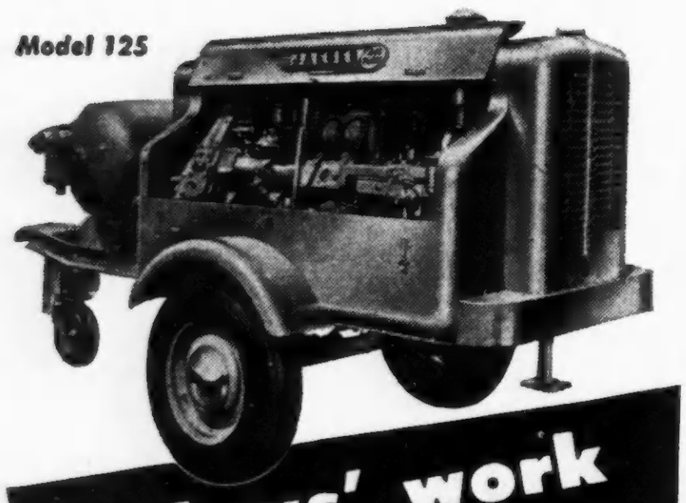
COOKING PERFORMANCE
No matter how much you pay you can't buy better cooking performance.

LARGE OVERSIZE OVEN
18" wide, 19" deep, will hold 30 lb. roaster.

EASY TO INSTALL
Comes fully assembled.

BEAUTIFUL DESIGN
Provides sales floor appeal.

HARDWICK STOVE COMPANY, Cleveland, Tennessee



4 days' work now done in 3

with

JAEGER

"new standard"

compressors

Jaeger Model 125 runs 2 heavy duty or 3 medium breakers at full 90 lbs. pressure, doing 30% to 40% more work than at 70 lbs. pressure from a 105 ft. machine.

Other Jaeger "new standard" sizes, 75, 185, 250, 365, and 600 ft., give you comparable work increases. Cost no more than smaller old sizes. Send for Catalog and prices.

THE JAEGER MACHINE CO.
Columbus 16, Ohio

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TRADE MARK
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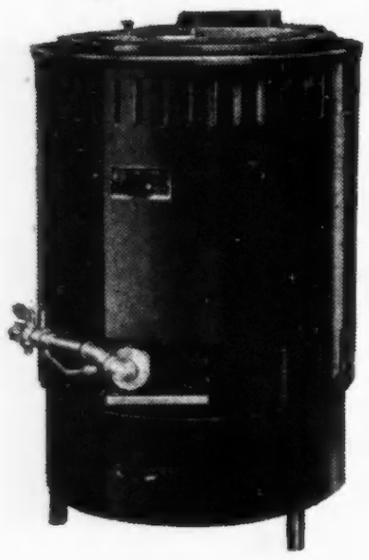


GAS-FIRED INCINERATOR

AMERICAN GAS ASSOCIATION · APPROVED · COMPLIES WITH NATIONAL SAFETY REQUIREMENTS

AGA APPROVED

BUILDS BASE LOAD

Plus

Much better than average

MERCHANDISING PROFIT

A "MUST" for homes with automatic heat—needed in every home. Commercial size also available.

INCINOR SALES MAKE FRIENDS FOR GAS COMPANIES

Write for details.

BOWSER, INC., INCINERATION DIVISION
CAIRO, ILLINOIS

- OBITUARIES -

D. W. NORRIS, Pasadena, Calif., president of The Lennox Furnace Co., Syracuse, N. Y., died suddenly in Columbus, Ohio, on Oct. 5. Mr. Norris purchased a controlling interest in the Lennox company in 1904, expanded the Marshalltown, Iowa, plant and built or acquired factories at Syracuse, Columbus, Pasadena, Fort Worth, Decatur (Ga.), and Salt Lake City. He was also the principal owner of The Armstrong Furnace Co., with factories at Columbus and Des Moines, and of The Lima (Ohio) Register Co.

JOHN F. MOONEY, 53-year-old Florida gasman, died in Orlando recently. Since 1943 he and Calvin E. Williams of Baltimore were manufacturers representatives in the South for A. O. Smith Corp., Bowser Inc., Standard Gas Equipment Corp., and several other firms. Mr. Mooney began his career with the North Shore Gas Co. in Waukegan, Ill. He was active in the Southern Gas Assn., Florida-Georgia Gas Meters Assn., and the Gild of Ancient Supplers.

T. R. DOBSON, 49-year-old vice president of Jersey Central Power & Light Co., Asbury Park, N. J., died on Sept. 18. Mr. Dobson joined Jersey Central in 1945 after serving as vice president in charge of sales for the Pennsylvania Edison Co. He directed sales activities and was in charge of rates and commercial offices for Jersey Central. Mr. Dobson was instrumental in bringing natural gas to the Jersey shore, and he also formulated plans for a proposed drive-in office at Seaside Park.

EDGAR R. CROFTS, operating vice president and a director of Rochester (N.Y.) Gas & Electric Corp., died Sept. 9 after a brief illness. He had been associated with the utility for more than 33 years, beginning in 1916 as a design engineer. He became a vice president in 1944, was placed in charge of all electric, gas and steam operations in 1946, and was added to the firm's executive committee several months ago.

JOHN L. YORK, advertising manager for Clark Bros. Co. Inc., Olean, N. Y., died recently after an extended illness. Mr. York joined Clark Bros. seven years ago. CHARLES N. GRAFF has been appointed to succeed him as advertising manager.

L-P GAS

DESIGN

EQUIPMENT

ENGINEERING

FUEL SUPPLY AND CONSULTING SERVICE

UNITED PETROLEUM GAS COMPANY
806 ANDRUS BLDG., MINNEAPOLIS 2, MINN.

CATALOGS

HILL, HUBBELL & CO., division of General Paint Corp., 2627 Army St., San Francisco, Calif.—The fifth edition of the "Book of Pipe Protection" has been designed as a buying aid for engineers, technicians and purchasing executives interested in increasing efficiency of their pipe protection. The volume details coating and wrapping applications, Roto-Grit-Blast cleaning (pioneered by Hill, Hubbell), preheating, inspection methods, delivery scheduling, load unit shipping, and field handling.

ILLINOIS TESTING LABORATORIES INC., 420 N. LaSalle St., Chicago—Bulletin No. 2451-C describes Alnor distant reading electric thermometers and tells how to obtain accurate temperature readings between —100° F and +400°F on points up to 1000 ft distant. The bulletin presents every size and type of Alnor thermometer, enumerates the services for which each type is best suited, gives installation and operation instructions, and lists prices for every instrument.

BLACK, SIVALLS & BRYSON INC., 720 Delaware, Kansas City, Mo.—"BS&B Safety Heads, Chemical Feeders and Vent Valves" is an 8-page catalog which includes 27 photographs and drawings of products and fittings. Charts give capacities, ratings and specifications. "BS&B Pipe Half Soles" describes and illustrates two pipe half soles now available—the standard and the crimped types. Table of specifications and prices is included.

ROOTS-CONNERSVILLE BLOWER CORP., Connersville, Ind.—Bulletin 21-B-37 covers Type AF small rotary positive blowers for pressure or suction service. These blowers are built in 18 standard sizes with capacities ranging from 5 to 700 cfm up to 3 lb, 5 to 415 cfm up to 5 lb, and 15 to 245 cfm up to 7 lb. Construction features and operating advantages are discussed, and different driving arrangements are illustrated.

DOWNINGTOWN IRON WORKS INC., Downingtown, Pa.—"Plate Fabrication and Heat Exchangers" is a 16-page bulletin containing lists of general facilities, manufacturing equipment, welding procedure qualifications, and standard heat exchanger construction details. It also has sections devoted to typical plate fabrication and heat exchanger examples with story and illustrations of plant and manufacturing equipment.

TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago—Bulletin 493 announces that Taylor Spiral-Weld pipe is available and that prompt deliveries can be made from Carnegie, Pa., or Fontana, Calif. The catalog shows size sand wall thicknesses available and also illustrates forge fittings and flanges intended for use with Spiral-Weld pipe. Typical applications are listed.

THE BRISTOL CO., Waterbury 91, Conn.—Bulletin No. W1816 describes the "Electronic Pyrotrol," a new combustion safeguard. Application of the Pyrotrol in protecting gas-fired ovens, furnaces, kilns, boilers, dryers, kettles, and similar heating equipment from the danger of gas explosions during ignition, operation, and shutoff is detailed.

CURRENT READING

PRESSURE LOSS AND AIR FLOW Characteristics of A Box Plenum — by S. F. Gilman, R. J. Martin, W. R. Hedrick, and S. Konzo, all of the University of Illinois. The paper was originally printed in the American Society of Heating & Ventilating Engineers Journal Section, "Heating, Piping & Air Conditioning."

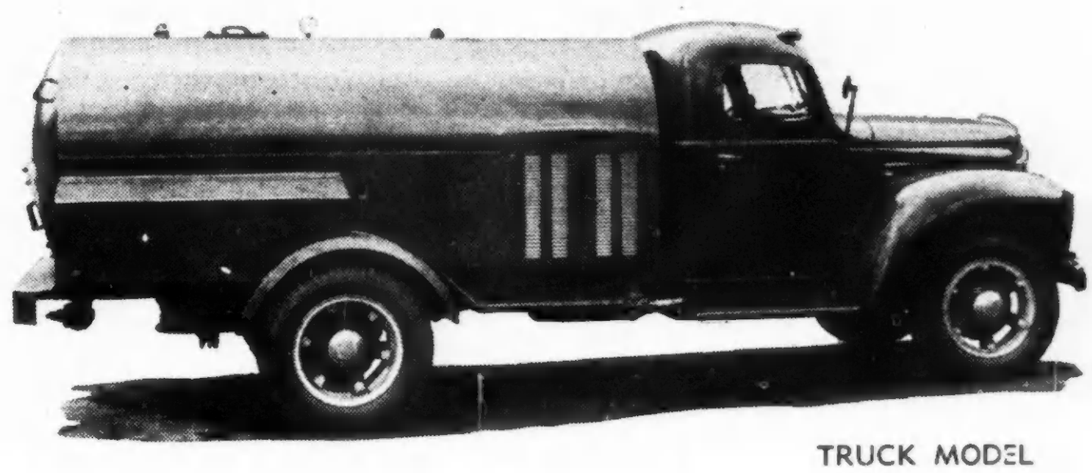
In summary, the paper states that an investigation of a box plenum with six branch outlets has been conducted. The performance characteristics obtained include the distribution of air to the outlets, the flow pattern inside the plenum, and the pressure losses. The results show that the entrance section must be designed for minimum pressure loss if unstable operation of the system is to be avoided. The following conclusions are presented:

1. The total pressure loss associated with a box plenum is composed of an entrance, turbulence, and outlet loss. The entrance and turbulent losses cannot be logically separated.
2. The pressure loss at the entrance to the branch outlets is in good agreement with the general accepted value.
3. The pressure losses and air flow conditions within a box plenum are not affected by the addition of equal resistance to each outlet.
4. For all practical purposes, the losses with the remote and close coupled fan positions are the same. Therefore, the results will apply to field conditions when the fan is located very close to the plenum.
5. Take-off fittings for branch outlets should not be located within 12 in. of the upstream corners of the plenum if excessive balancing losses are to be avoided.
6. The plenum loss with the abrupt expansion entrance section installed is much higher than the calculated entrance loss alone, indicating the loss due to turbulent mixing in the plenum is severe.
7. Unless the entrance section of a box plenum is carefully designed, large pressure losses and unstable distribution of air to the branch outlets will result.

AGA INFORMATION LETTERS—Prepared by the Industrial and Commercial Gas Section. Letter No. 31, "Die Casting," discusses a competitive threat to industrial gas sales and reports on the active efforts of competition to obtain the die cast metal melting business. "Blast Preheating for Foundry Cupolas" is the title of Letter No. 34 which discusses the methods of preheating blast air for foundry cupolas and describes the use of an external fuel in either direct or indirect heaters to raise the temperature of the blast air to that point found to be most advantageous for the particular cupola under consideration. It is believed that this subject will be of great interest to industrial gas men because it describes a potential new use for gas.

WHAT YOU SHOULD KNOW About Your Laboratories—Published by the AGA Testing Laboratories, Cleveland and Los Angeles, for distribution among appliance and accessory manufacturers. Extra copies are available from the Laboratories, and suggestions and criticisms will be welcomed.

CLEAN DRIPS FASTER



TRUCK MODEL

With a Whittington Hydro-Scavenger, you can remove condensate from drips and open clogged service leads in less time . . . and with less manpower. Cleans drips up to 30 feet deep . . . loads and unloads up to 100 gallons a minute! Requires only one man to operate. Creates 27" Hg. vacuum for loading; 20 pounds pneumatic pressure for unloading—to overhead tank, if desired. Available in truck, trailer and skid models, powered by two-cylinder gasoline engine. Truck model also available with power take-off drive. Collection capacities from 300 to 1,000 gallons.

Write today for Bulletin HS-49. WHITTINGTON PUMP & ENGINEERING CORP., 1128 Prospect Street, Indianapolis 3, Indiana.

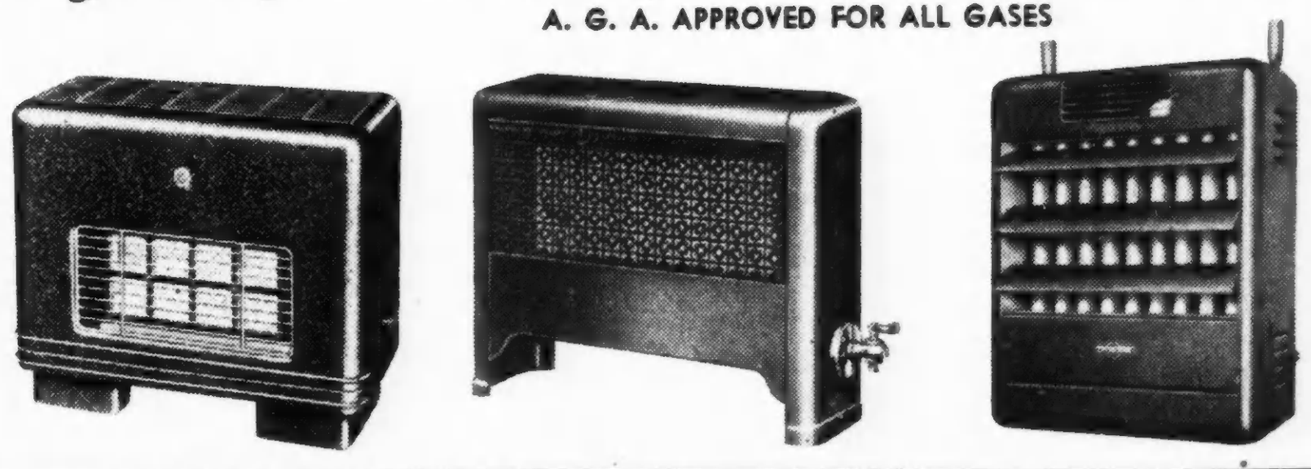
WHITTINGTON

Peerless

Gas Heating Products

Styled for Beauty – Built for Duty

A. G. A. APPROVED FOR ALL GASES



VENTED CIRCULATORS	ENCLOSED RADIANT HEATERS	SUSPENDED FAN TYPE UNIT HEATERS
20,000 to 60,000 B.T.U. Sizes No. 7770 Series has Radiant Front Styling No. 7780 Series has Closed Front Styling	20,000 - 28,000 B.T.U. No. 6190-D No. 6192-D Other sizes and styles for rooms and fireplaces	65,000 to 200,000 B.T.U. Sizes For Domestic and Commercial uses

Write today for descriptive literature on this complete line that is made to sell . . . made to last . . . made to satisfy.

PEERLESS MANUFACTURING CORPORATION LOUISVILLE 10, KY.

EXPERTS IN

GAS CHANGE-OVER SERVICE

LET our experienced gas conversion specialists save you time, cost and trouble on every gas change-over project—for natural, manufactured or LP-gas. Our comprehensive service includes:

★ Physical and Sales Potential Surveys
★ Engineering and Construction Changes
★ Appliance and Equipment Adjustments
★ Public Relations Planning

AMERICAN GAS CONVERSIONS, INC.

AGC

ROCKEFELLER CENTER
630 FIFTH AVENUE
NEW YORK 20, N. Y.

A SUBSIDIARY OF
PACIFIC GAS CORPORATION

IRON SPONGE
"CHOICE"
of the gas industry

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GAS APPLIANCE SERVICE Water Heater Manual, Third Edition—Published by the American Gas Assn., 420 Lexington Ave., New York 17, N. Y., this manual has been prepared by the AGA Committee on Gas Appliance Installation and Service Manuals. Progress made in the design of water heaters and their controls since the second edition was published in 1938 has made obsolete much of the material in that edition. The contents have been completely revised, expanded and modernized.

The scope of the manual has been broadened to include information that will be helpful to those active in the LP-Gas industry. While most of the service material is applicable to all types of gas the differences, where they exist, are noted.

The section dealing with specific servicing instructions for individual heaters and controls has been enlarged and now contains equipment instructions for 19 typical water heater manufacturers and 11 control manufacturers.

The pocket size manual is bound with metal rings and contains 296 pages and 167 illustrations. Price of the new edition is $1.50.

STUDY OF THE FACTORS Affecting the Application of Gas to Counter Appliances—Research Report No. 1130 of the AGA Testing Laboratories, Cleveland. The majority of counter appliances are manufactured by organizations that do not have complete laboratories or engineering facilities available. The AGA Committee on Industrial and Commercial Gas Research therefore sponsored this study which was made by the association's laboratories.

This report, dealing with dry food warmers, is the third in a series of research publications designed to aid manufacurers in improving counter appliances. As of January 1949 two manufacturers had made available six models including numerous combinations. All of these units were approved in accordance with ASA requirements.

Copies of the report may be obtained from AGA headquarters for 75 cents.

INDUSTRIAL GAS SCHOOL LECTURES—The complete set of lectures delivered at the 1949 AGA Industrial Gas School held in Indianapolis, Ind., is now available in a bound volume which is priced at $5. These lectures, many with illustrations, charts or drawings, make up a short course in industrial gas which may be used either as a textbook or as a reference manual. The examination questions and answers used for the Industrial Gas School will be furnished with the volume upon request. Orders should be directed to the Industrial & Commercial Gas Section at AGA headquarters.

THE NATIONAL FUEL EFFICIENCY Program During the War Years, 1943-45—Published by the Bureau of Mines, Bulletin 469 is available from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. The publication describes the organization, personnel, methods of operation, and accomplishments of the wartime program which was conducted by the Bureau of Mines in cooperation with industrial and commercial fuel users during the war. Price: 35 cents.

MIXED GAS RESEARCH REPORTS—These bulletins may be obtained from the AGA Testing Laboratories, 1032 E. 62nd St., Cleveland. They were prepared under the direction of the gas production research committee. A final report summarizing the entire investigation will be published by the association in the near future.

Report 1106-A—Interchangeability of Other Fuel Gases with Coke Oven Gas, $1.50. Limits are determined for addition of 29 supplemental gases to a coke oven adjustment gas of 535 Btu, 0.41 sp. gr. *Report 1106-B*—Interchangeability of Other Fuel Gases with Carburetted Water Gases, $3. The following carburetted water gases are covered as the adjustment gases:

(1) 535 Btu, 0.69 sp gr, of medium inert content
(2) 535 Btu, 0.73 sp gr, of high inert content
(3) 535 Btu, 0.63 sp gr, of low inert content

Report 1106-C—Interchangeability of Other Fuel Gases with a Mixed Coke Oven-Carburetted Gas, $1.50. This covers a 535-Btu, 0.55 sp gr adjustment gas. *Report 1106-D*—Interchangeability of Carburetted Water Gases with a Mixed Natural Gas, Blue Gas, Cracked Natural Gas and Producer Gas, $1.50. A 535-Btu, 0.62 sp gr adjustment gas is considered.

AMERICAN STANDARD Steel Pipe Flange and Flanged Fittings Standard B16e-1939—Supplement No. 1 to this American Standards Assn. publication has been issued. The supplement was discussed in an article in the August issue of *Standardization*, portions of which are quoted below:

"Sectional committee B16 has concentrated on the most needed sections and has issued this supplement (which) will serve until the committee can complete a revision of the whole standard. . . . In addition to revising the rating tables of B16e-1939, Supplement No. 1 also brings the material sections up to date and establishes shell thicknesses for welding end valves."

This supplement, B16e6 1949, can be obtained from the American Standards Assn., 70 East 45th St., New York 17, for 40 cents.

QUESTIONS AND ANSWERS on Propane and Butane Fuels—by J. F. Barkley, chief of the Fuels Utilization Branch, Bureau of Mines. This booklet, Information Circular 7519, may be obtained from the Publications Distribution Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. In addition to telling what propane and butane are and outlining their uses, the circular answers common questions concerning required safety precautions, transportation, special valves and fittings, type of burner needed, and how industrial plants and public utilities use LP-Gas. Diagrams and photographs are included.

DE LAVAL ENGINEERING HANDBOOK—A new edition of this handbook has been published by De Laval Steam Turbine Co., Trenton, N. J. It is a source of practical information on the design, operation and installation of pumps, turbines, compressors and gears. Copies of the book are available from the company's advertising department at $2 each.

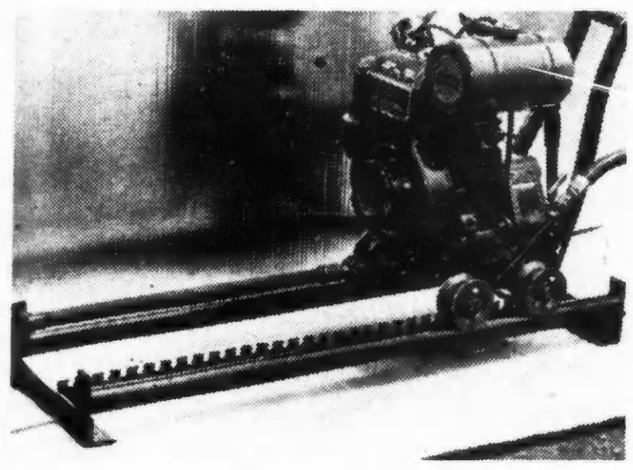
NEW PRODUCTS

Boring Machines

LUBE JACK CO., 1415 - 14th St., Santa Monica, Calif.

MODEL: Earthworm.

APPLICATION: This new line of Earthworm machines permits laying of pipelines of all types up to 3 in. in diameter and up to 150 ft in length, without the need of breaking surface ground. In many applications it is possible to use pipe or conduit as drill stem sections and leave it underground as a permanent installation.

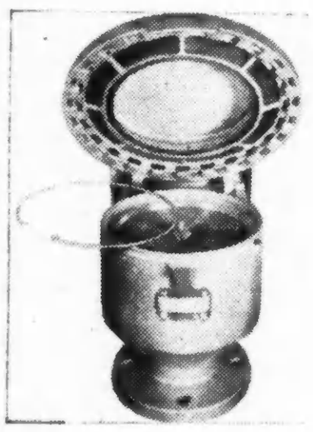


DESCRIPTION: Accuracy of the units, when drilling lines as long as 150 ft, can be maintained within 1 in. of the target area. In operation, water is forced through the drill stem as a lubricant and to wash back the cuttings. Three types of bits are available to work in all types of soil. Three-power rated models are available.

Safety Combination

BLACK, SIVALLS & BRYSON INC., 720 Delaware, Kansas City 6, Mo.

MODEL: Flame arrestor pressure-vacuum vent valve combination.



APPLICATION: To reduce the danger of flash-back fire in atmospheric storage tanks.

DESCRIPTION: This device combines the company's patented VVH pressure-vacuum vent valve with a flame arestor bank which acts to prevent propagation of flame into storage tanks. The rolled aluminum flame arrestor bank fits into the throat of the vent valve and becomes an integral part of the valve body. Rubber-to-metal sealing makes the valve tight and prevents its freezing shut. The valve and flame arrestor make a compact assembly that offers a minimum of resistance to vapor flow. It has been tested and approved by Underwriters' Laboratories.

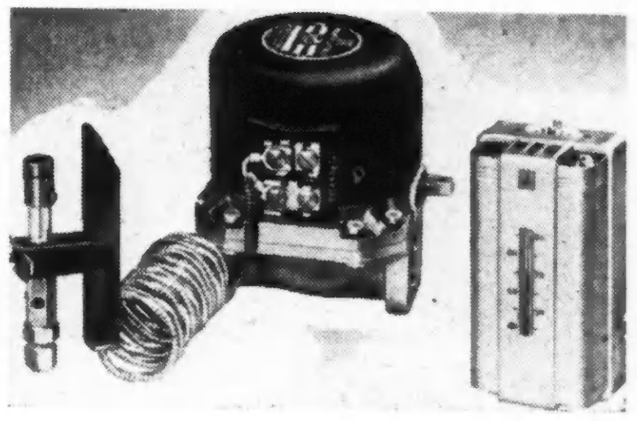
Control Package

MINNEAPOLIS - HONEYWELL REGULATOR CO., Minneapolis, Minn.

MODEL: Y200 Powerpile control system.

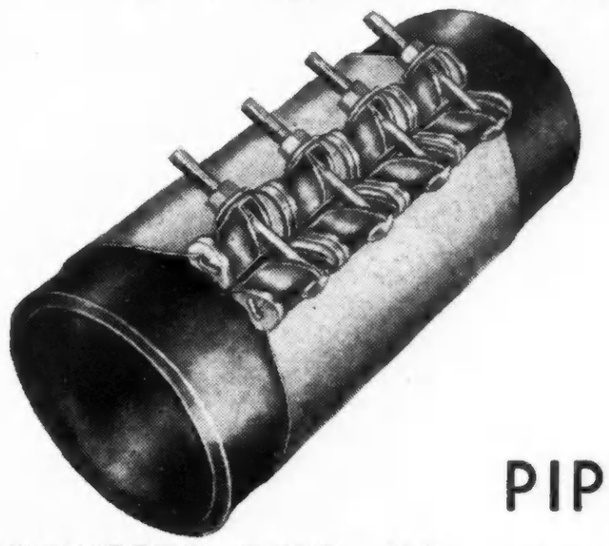
APPLICATION: This self-contained automatic control system for gas-fired heating plants generates its own electricity to operate a thermostat and automatic gas valve. It may be used in non-electrified rural areas and will provide constant heating despite power failure in areas where electricity is available.

DESCRIPTION: Operation is based on the electrical phenomenon that two unlike metals joined at one end can convert heat energy into electrical energy when the metals are subjected to flame. The Powerpile is composed of 25 thermocouples and generates 400 to 500 millivolts, although the system will operate safely on as low as 200. There are three units as shown in the photograph: the Powerpile (left) which contains a pilot burner, a diaphragm valve (middle) which employs a self-contained polarized relay to open and close the gas flow to the burner, and



a thermostat (right) which uses electrical energy supplied directly by the Powerpile unit. The instrument acts as its own safety pilot in caes of flame failure and will shut down the entire heating plant.

STOP THAT LEAK!



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LP-GAS SPECIALISTS—100% PLANTS—STAND-by—Enrichment—Peak Shaving. Twenty years experience. H. Emerson Thomas and Associates Inc., Westfield, New Jersey.

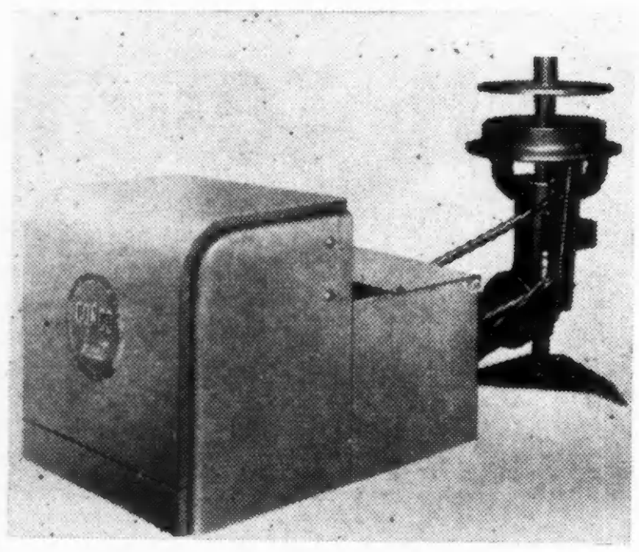
WANTED: USED CUTLER-HAMMER RECORDING Calorimeter or Thermeter. Illinois Electric & Gas Company, Murphysboro, Illinois.

Conversion Burner

CONCO ENGINEERING WORKS, Mendota, Ill.

MODEL: Conco Monoflame gas burner.

DESCRIPTION: Two models—deluxe and standard—are available, with input ranging from 60,000 to 210,000 Btu. The burner is fully packaged and factory wired. A spreader-



type flame is employed which adapts the burner to many installations. Features include a telescoping venturi mixer which provides flexible adjustment of air box in relation to heating plant, adjustable iris orifice for easy adjustment of gas flow, automatic pilot, push button pilot lighter, and electric controls such as solenoid gas valve, thermostat and limit control.

Domestic Heater

ROYAL HEATERS INC., 1024 Westminster Ave., Alhambra, Calif.

MODEL: Royal Jet-Flow.

DESCRIPTION: This factory-assembled unit it offered with Btu input from 25,000 to 55,000. The latter occupies a space of 10⅜ in. x 27⅜ in. Through use of the jet principle a velocity of 300 fpm is achieved, throwing heat to all parts of the average home, the manufacturer states.

Air is taken in at floor-level registers and passed over the heating element into a cone-shaped duct. As the heated air is compacted in the stack, its velocity increases. When it leaves the registers just below ceiling level, it is traveling at 300 fpm. A portion of the hot air is immediately forced to the floor and the balance flows across the ceiling, down outside walls, and across floors to the return register.

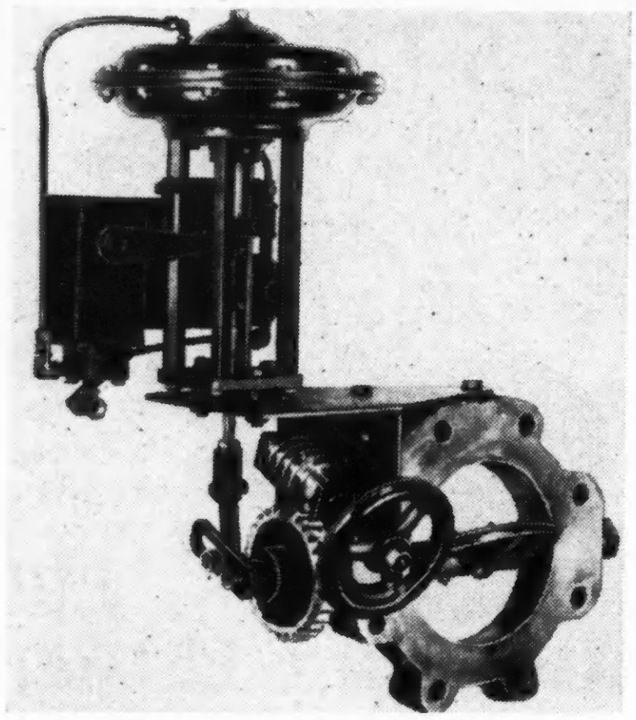
Air-Operated Valves

FISCHER & PORTER CO., Hatboro, Pa.

MODEL: Rato - Vane air - operated butterfly valves.

APPLICATION: For process control.

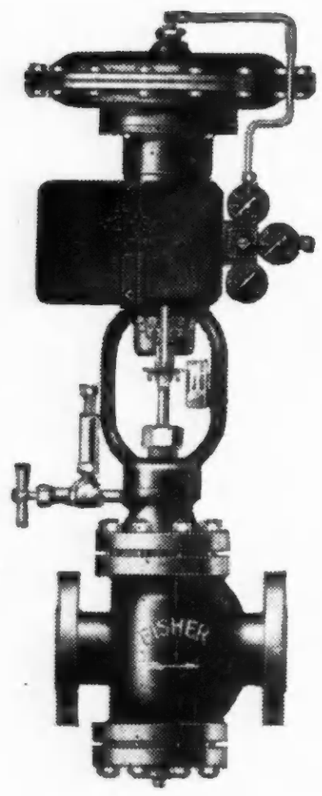
DESCRIPTION: Advantages claimed for



these valves are great strength, lightness, compactness, convenience and accessibility. The entire assembly is installed in the line with one set of through-bolts, and 125-lb drilling is standard. Face-to-face dimensions are small. The line is offered in sizes from 3 in. through 12 in.

Static line pressures up to 125 psig and differential pressures up to 50 psig can be handled. Rato-Vane valves are supplied with hand jack screws, air-operated diaphragms, and valve positioners.

Valve Controller

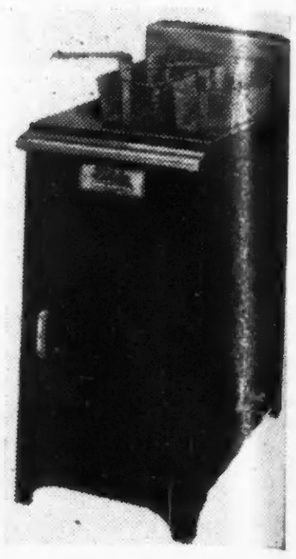


FISHER GOVERNOR CO., Marshalltown, Iowa.

MODEL: Positrol, Series 3500.

DESCRIPTION: The Positrol is simple in design, consisting of a few levers, a bellows unit and a spring. Valve travel is adjustable between ¼ in. and 3 in. It is a force balance type valve controller available with or without by-pass, and it may be used as a remote position indicator. It is compact and rugged in construction. Bulletin 3500 outlines construction features, principles of operation and complete specifications.

J. C. PITMAN CORP., Lynn, Mass., has obtained AGA approval for its Frialator which is now supplied with an "Area" burner and new oval immersion type stainless steel tubes. All types of gases may be used and conversion from one to another is said to be simple.



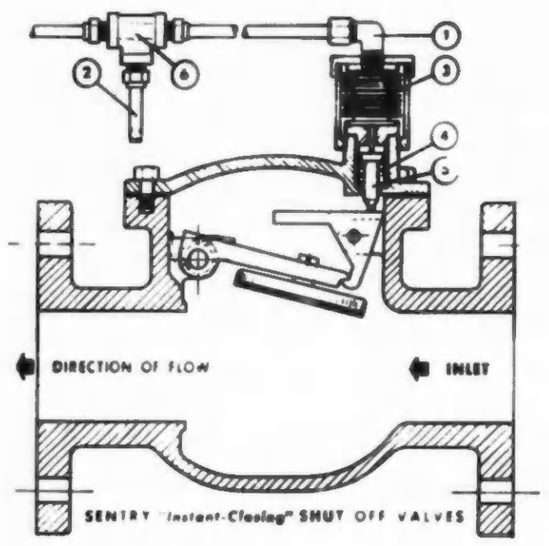
Control Valves

McRAE VALVE CORP., 620 S. Main St., Los Angeles, Calif.

MODEL: Sentry valves.

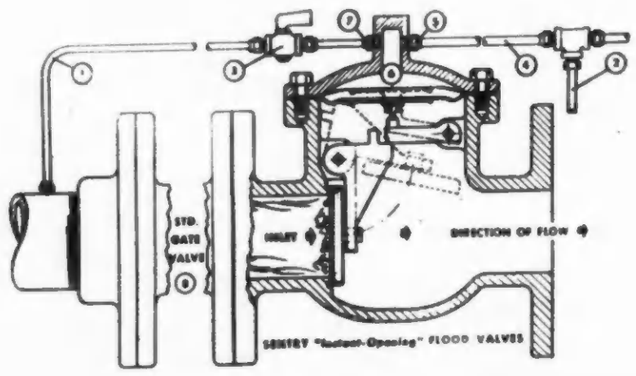
APPLICATION: For automatic line control in the event of fire or other emergency.

DESCRIPTION: The Sentry automatic "instant-closing" shutoff valve will close all gas, fuel oil or other "hot" lines entering the danger area. A small tube in which a nominal pressure is maintained is connected to the valve and carried to any part of the plant, and the self-operating valve mechanism functions automatically whenever the seal on the control line is broken. As many control points as desired may be placed in the single line to operate one or any number of valves.



The companion Sentry valve for "instant-opening" automatically provides a deluge of water at full line capacity, directed to any critical area requiring instantaneous flooding. This valve may also be used for automatic dumping of tanks and pressure vessels; full pressure for steam, fog, or CO_2 fire smothering systems, etc. It works on the principle that any emergency which breaks the seal on the control line will operate the valve or a series of valves.

Both valves are self-contained, automatic units and are not dependent on outside power or manual control.



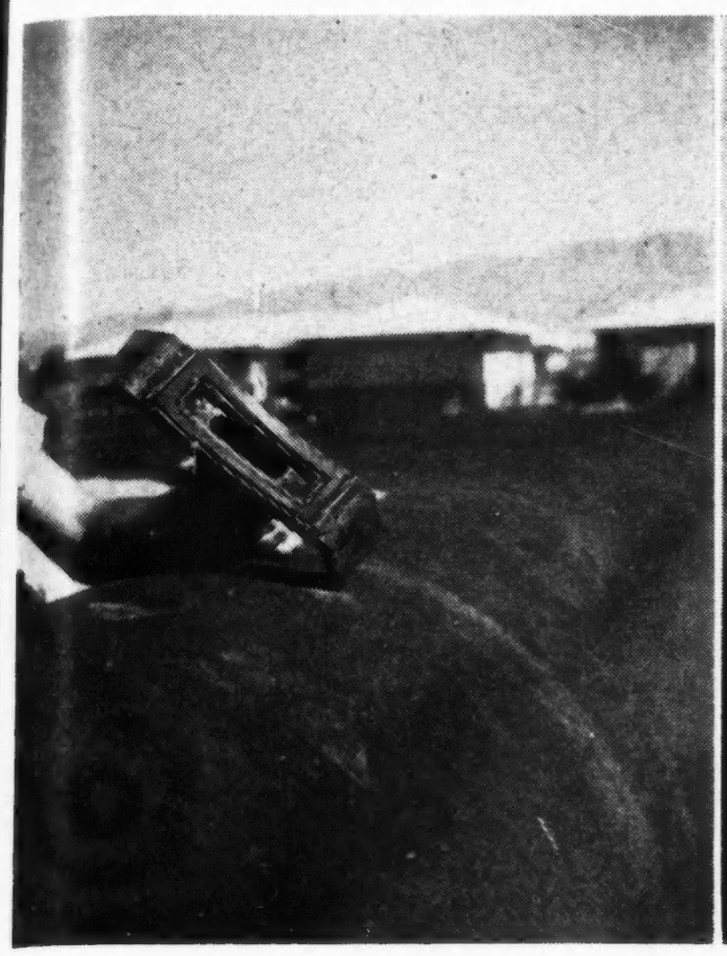


Fig. 1. Underside of venting head used to vent leakage while pipe is prepared for installation of sleeve.

Fig. 2. Venting head held in place with strap and bolts.

Fig. 3. Underside of 180° welding sleeve segment showing vent and gasket shaped to fit corrugation.

REPAIRING LEAKS

On The California Section Of The Texas Pipeline

By J. A. MILLEN

IN making necessary repairs of leaks on the California section of the Texas-to-California line, as located by the extensive leakage survey, we utilized two general methods.

The very small pinholes were repaired by peening with a center punch. All leaks greater than small pinholes were repaired by arc welding vented sleeves over the leak with the line at normal pressure. It was decided to use full 360° welding sleeves rather than patches for repairs in order to minimize stress concentrations in the pipe wall. The welding sleeves were fabricated from ½-in. thick A-7 steel and were made in 180° segments with a center corrugation 2-in. wide and

The California section of the Texas-to-California line was completed in October, 1947. This section comprises 213 miles of 30-in. line extending from Blythe, Calif., to Santa Fe Springs, near Los Angeles. Before it was placed in operation it was purged and packed to about 250 psi by the builders, using gas available at the terminal end.

Texas gas was first delivered into the line Oct. 30, 1947, and by mid-November compression facilities were available to permit a standup test to be made at maximum operating pressure. The line was tested for at least eight hours at the maximum working pressure in each of three sections.

A walking patrol uncovered three small leaks during the tests, which proved to be defects in factory girth welds. While it was concluded that the line was structurally sound, it was believed that other leaks existed, so an intensive survey was made over the entire length of the line.

To speed up the leakage survey and to cut costs, two foremen devised a mechanical "sniffer," which was described in an article in GAS, September 1948 (p. 66). The leaks detected by the sniffer were repaired in the manner described in the first portion of this article, which is a shortened version of a paper Mr. Millen presented at the PCGA transmission conference in San Francisco May 19.

Mr. Millen is manager of the Texas pipeline division for Southern Counties Gas Co. of California, operator of the line.

Fig. 4. Both sleeves and segments in place and ready for welding.

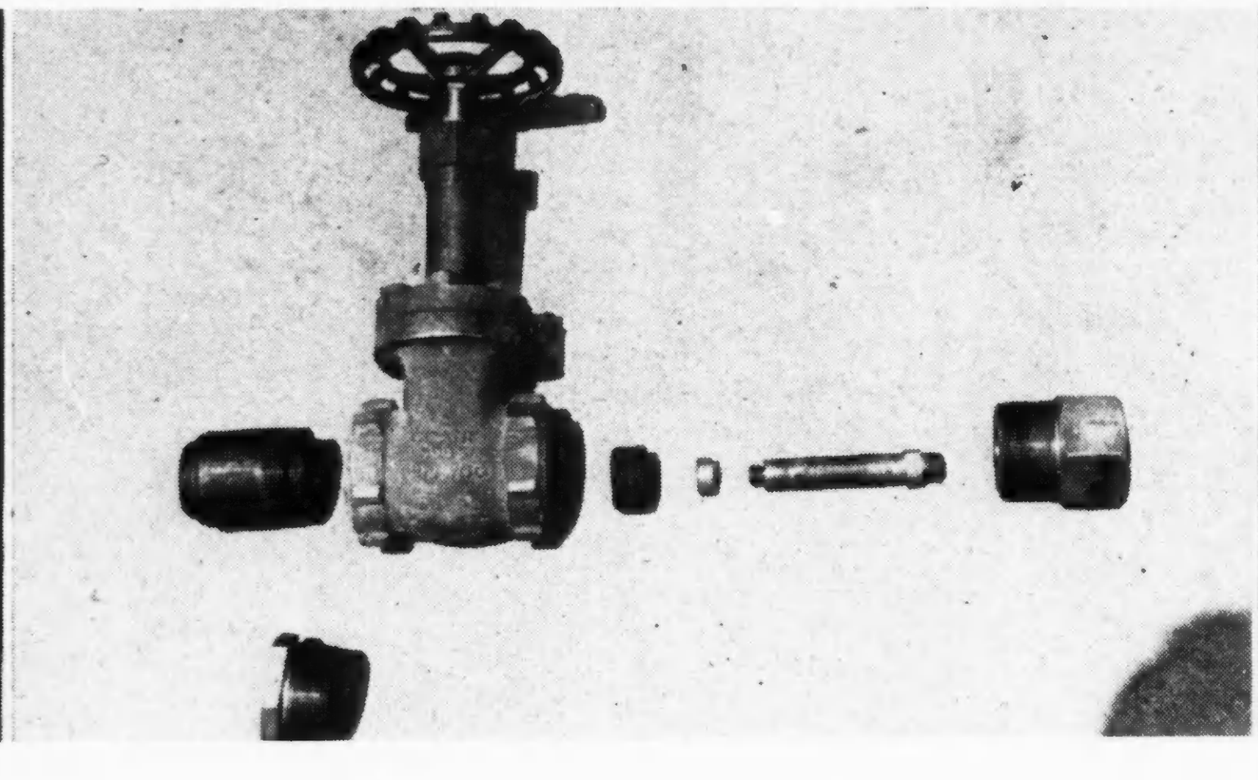


Fig. 5. Component parts of nipple and plugging tools: 2-in. abandoning nipple, gate valve, inner plug, 3/8-in. lefthand thread nut, inserting tool, and adaptor from valve threads to inserting machine thread. Bushing, 2-in. x 1 1/2-in., in foreground, is used with 1 1/2-in. abandoning nipple.

Fig. 6. Mueller E-4 tapping machine is used to insert inner plug.

½-in. high. Two widths of sleeves were used, 6-in. width for repairs to girth welds and 12-in. width for repairs to longitudinal welds. The defects in the longitudinal welds were localized and, for the most part, were located in manual repairs made in the weld before the line was placed in operation.

Repair Procedure

The procedure followed in this type of repair is illustrated in *Fig. 1* to *Fig. 7* and can be described as follows: When the leak is uncovered, a temporary venting head with gasket is placed over the leak and held in place with the strap and bolts from a Skinner vented plug clamp. After the leakage is confined to the head and vented, the protective pipe coating is removed. With the use of a pneumatic sander and grinder the circumference of the pipe is cleaned to a bright surface and the longitudinal weld reinforcement is ground flush with the pipe wall to insure that the sleeve to be welded over the pipe will fit tightly.

In the meantime, a hole is torch cut in the center of one of the 180° sleeve segments and a double extra strong steel abandoning nipple is welded over the hole in the sleeve to provide a vent for the leakage when the sleeve is welded to the pipe. The abandoning nipple is either 1½-in. or 2-in. depending upon the amount of leakage. These nipples have an inner steel plug with a slotted head and an outside steel cap.

Gasket Cemented

A ½-in. thick rubber gasket slotted in the center and shaped to fit the corrugation of the sleeve is cemented to the inside of the sleeve. The gasket is centered with respect to the vent nipple. Both 180° sleeve segments are then fitted over the pipe and held in place with chains and binders. A gate valve and stack are temporarily installed on the abandoning nipple and the sleeve is then welded to the pipe. The finished fillet welds are carried out 1 in. on the pipe wall.

After welding is completed the stack pipe is removed and the inner steel plug is inserted in the abandoning nipple. This is accomplished by first tack welding a 3/8-in. left hand threaded nut to the top of the steel plug and then, with the use of a Mueller E-4 tapping machine with an inserting tool, the plug is installed under pressure control. When the plug starts to tighten, the left hand thread of the inserting tool backs out of the nut tack welded to the top of the plug. The machine and temporarily installed gate valve can be removed. The inner plug is tightened and the outside steel cap installed and seal welded. The tapping machine used for this operation is hydrostatically tested to 2000 psi.

Easily Made

This type of repair is easily made on high pressure lines since no attempt is made to stop the leakage until after the sleeve is completely welded to the line. After the abandoning nipple is plugged, the pressure between the circumferential sleeve and the pipe wall becomes equalized with the pressure inside the pipe.

Even though the repair is made by venting, the use of the abandoning nipple results in a completely welded job with no danger of leaks later developing at threads or packing glands which might be the case if a closed valve were left on an ordinary type vent nipple.

Positive Check

Shortly after the line was placed in operation it was decided to install internal corrosion coupons at intervals along the line to determine if internal corrosion of the pipeline would occur. Although it is not expected that internal corrosion will appear in the line, the installation and periodic examination of the test coupons will provide a positive check on the effectiveness of the purification and dehydration facilities

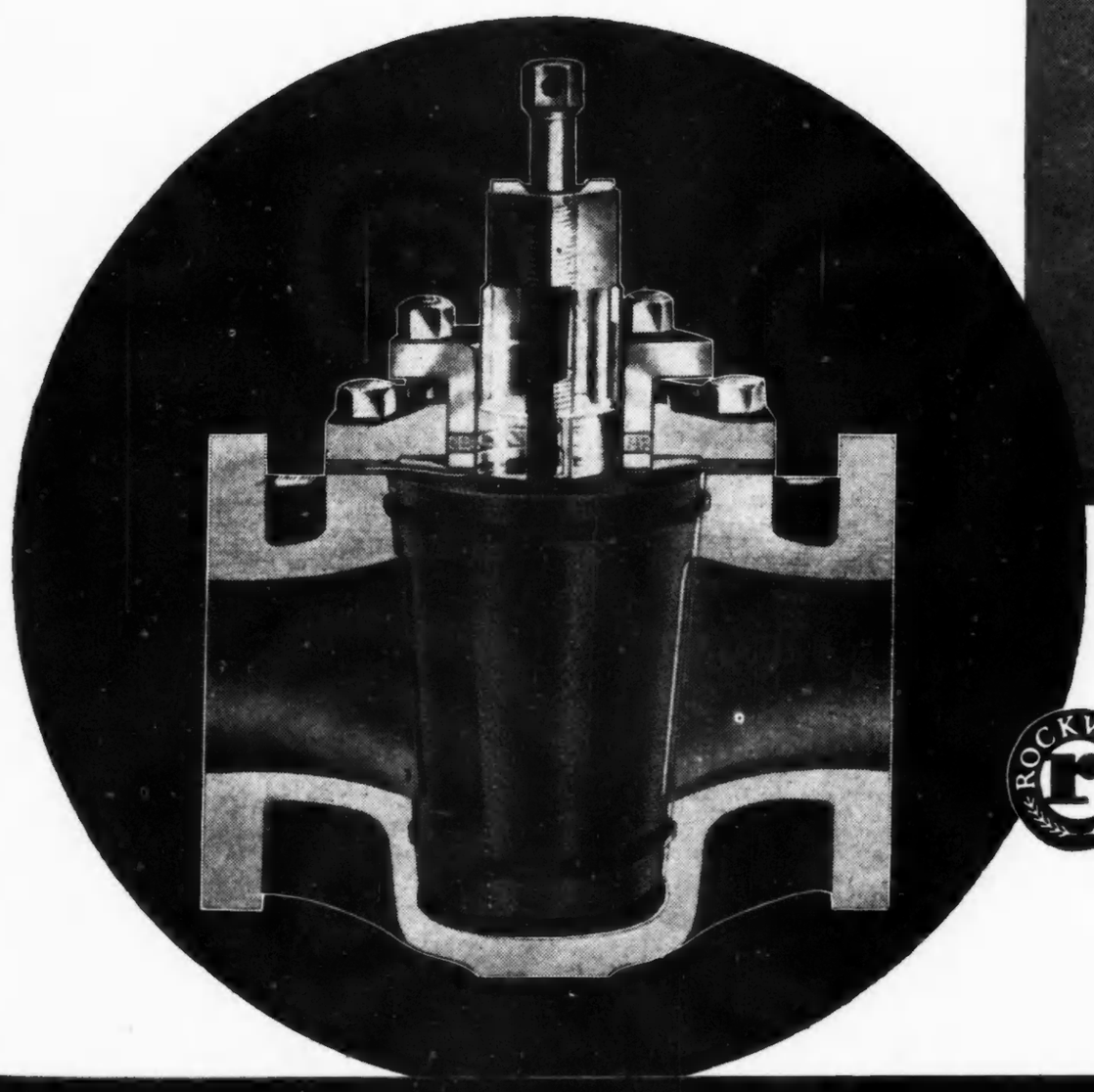
Fig. 7. View of a completed repair. Leak in this case was in a factory girth weld on the bottom of the pipe and adjacent to an A-frame support.

Hypermatic seals instantly and keeps valves sealed

The reason there are over 5,000,000 Nordstrom valves in service is because they are the most dependable type of positive closure known to industry. Lubrication performs the triple function of lubricating the plug, sealing the ports and jacking the plug. Lubrication is the "making" of the valve. There's no substitute for lubricant. It's vital. Now, we have miraculously improved the lubricant by development of Hypermatic. Fundamentally, a valve is used to shut off a line. To do that, a valve must be in itself a perfect seal. Hypermatic, with its impounded energy, keeps the valve sealed.

Gives Nordstrom valves greater efficiency, longer life

Nordstrom put pressure lubrication into plug valves, permitting practical use of this type of valve in industry. Then "Sealdport" lubrication was added so that the ports were securely sealed on all sides. Then other major improvements were brought forth, such as the Hypreseal design, Merchrome coating, use of stainless steel and special alloys. NOW the greatest of valve advancements—Hypermatic automatic lubrication—gives to Nordstroms the effect of an improved design.



WHY PLUG VALVE LUBRICATION *is vitally essential*

1. ROTARY ACTION, MOST POSITIVE CONTROL

Simplest valve design is a tapered plug. When properly lapped and fitted, it forms perfect closure, but it must be lubricated to insure easy turning and perfect sealing.

2. PLUG SURFACE SEALED BY LUBRICANT FILM

The Nordstrom valve employs pressure lubrication which forms a continuous film over the entire sealing surface, which is never exposed to the line. Easy turning is assured.

3. POSITIVE PRESSURE SEAL AROUND EACH PORT

Nordstrom "Sealdport" lubrication, by ingenious locating of connecting grooves in the plug and body, forms a pressure seal around each port which prevents internal and external leakage.

4. HYDRAULIC JACKING ACTION FREES PLUG

A few turns of the external lubricant screw regenerates pressure. If the plug is too tight to turn easily, a few extra turns of the screw hydraulically jacks the plug, freeing it.

5. HYPERMATIC LUBRICANT SELF-ENERGIZES FEED

As the "missing link" in perfect valve operation, Hypermatic lubricant now gives to Nordstrom valves automatic lubrication. Being self-energized by screwing down the lubricant screw, Hypermatic stores powerful energy to maintain constant feed indefinitely—for months in cases where valves are infrequently operated.

6. INSTANT CLOSURE IN EMERGENCY OR OTHERWISE

No longer is it necessary to refill an unserviced valve with lubricant before operation. By using Hypermatic, the valve is kept fully lubricated, ready to open or close instantly.

Greatly Multiplies Valve Life by Maintaining Valves in Fully Lubricated Condition—Saves Man-Hours

Nordstrom
LUBRICATED VALVES

NORDSTROM VALVE DIVISION—*Rockwell Manufacturing Co.*
400 North Lexington Avenue • Pittsburgh 8, Pennsylvania
Atlanta, Boston, Chicago, Columbus, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa . . . and leading Supply Houses • Export: Rockwell Manufacturing Co., International Division, 7701 Empire State Bldg., New York 1

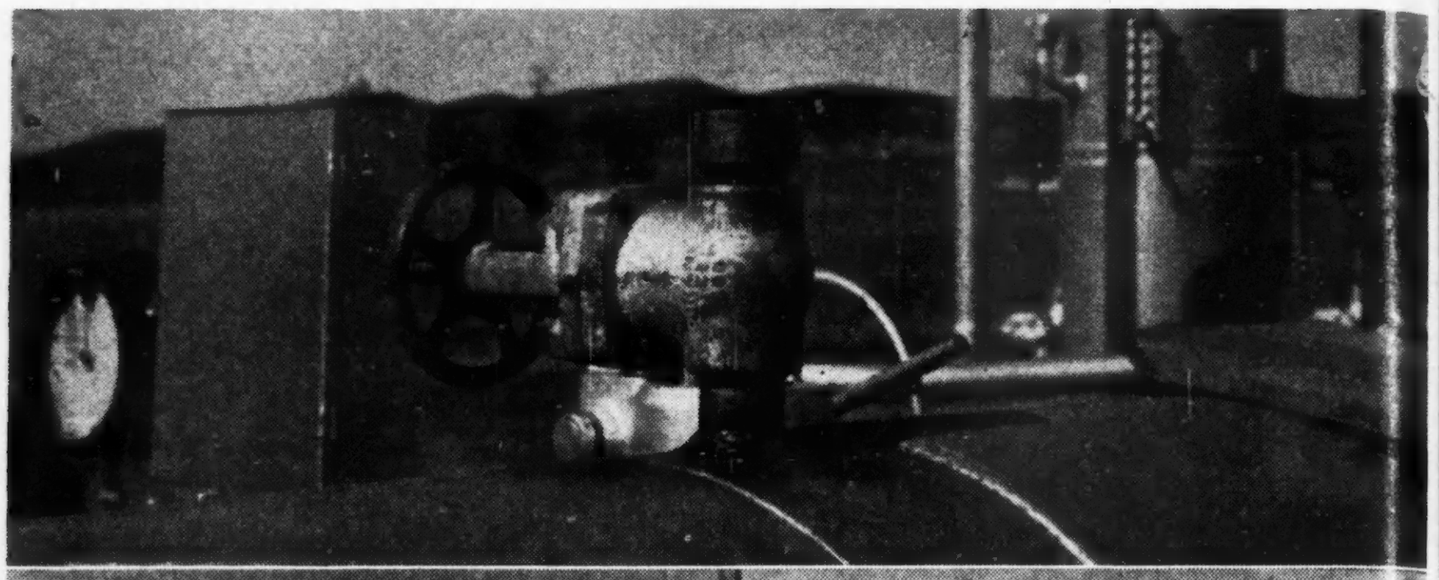


Fig. 10. Abandoning nipple welded to line with 2-in. gate valve and adaptor for tapping machine.

Fig. 11. Tapping machine attached to gate valve ready to drill 1⅜-in. hole.

installed at the field plants at the Texas end of the line.

Although the insertion of corrosion coupons in the gas stream of a pipeline at operating pressure is not new, you may be interested in the equipment used on this line at high operating pressures. The equipment is designed for use with complete safety at 1000 psi.

Same Nipple Used

The same type of 2-in. abandoning nipple used in making vented leak repairs is welded to the pipeline. A gate valve is installed on the nipple and a 1⅜-in. hole is drilled in the pipe wall using a Mueller D-4 tapping machine. The tapping machine used in this operation is hydrostatically tested to 2000 psi. The corrosion coupon inserting equipment is then installed on the gate valve, the valve opened, and the coupon

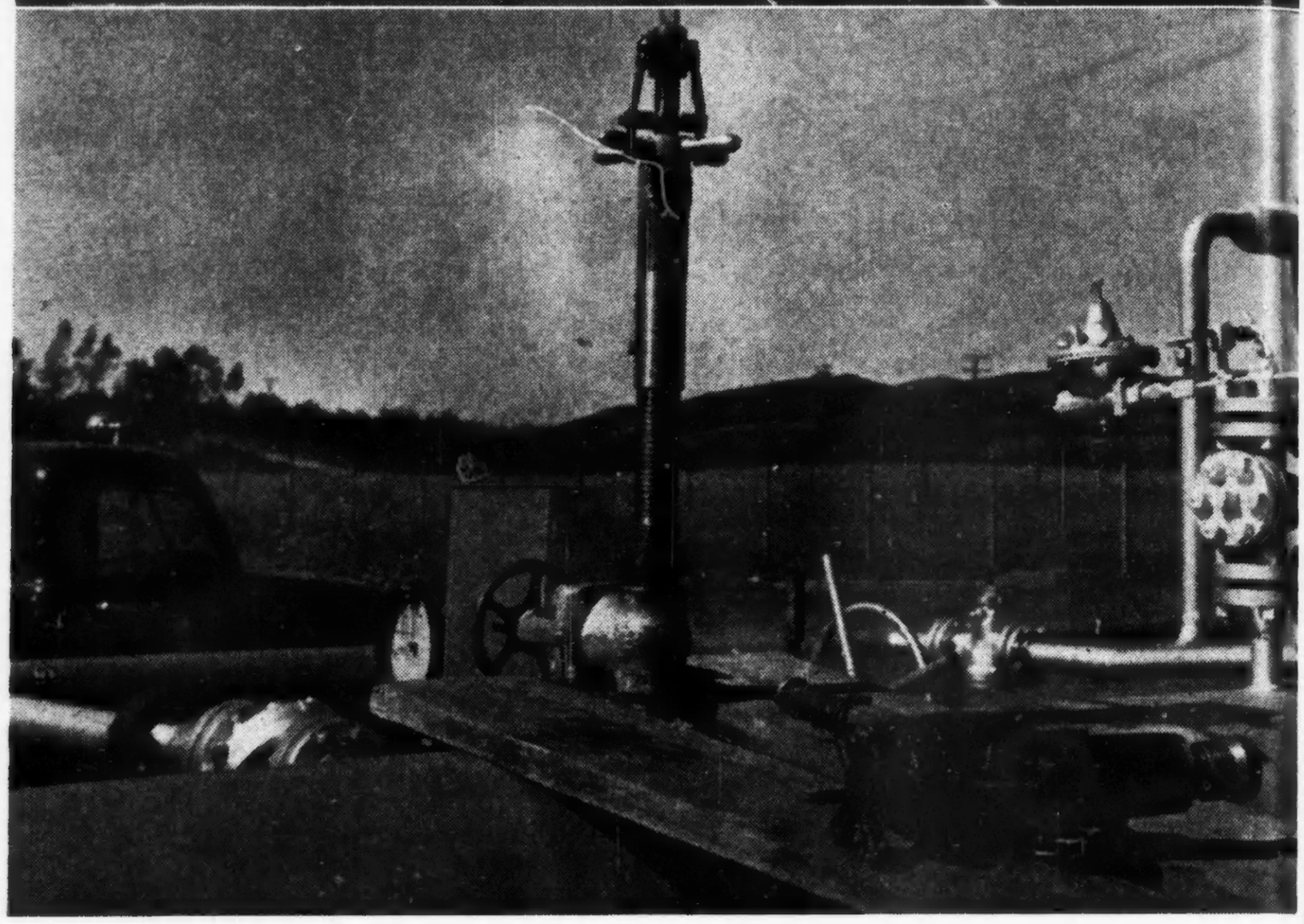
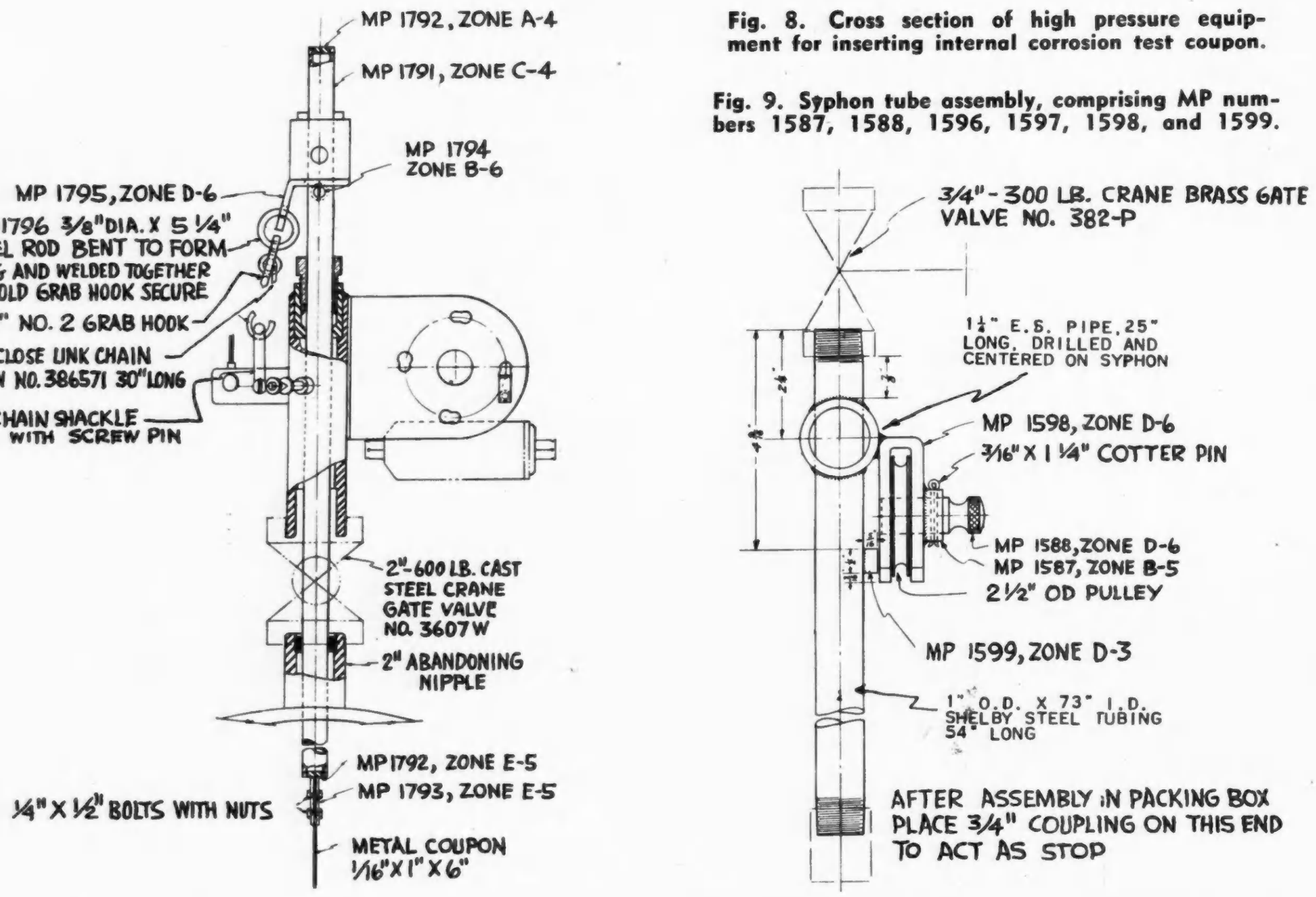
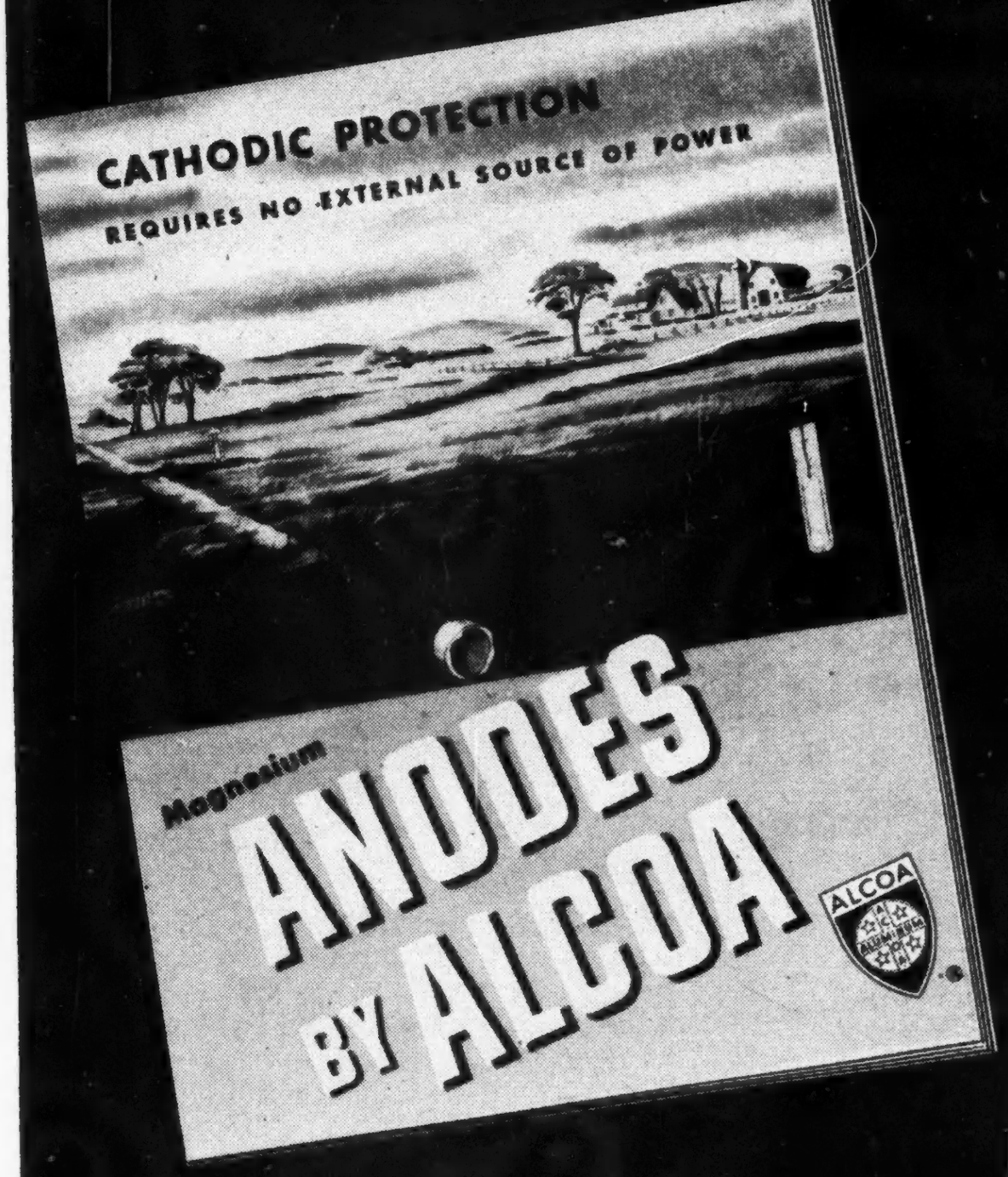


Fig. 8. Cross section of high pressure equipment for inserting internal corrosion test coupon.

Fig. 9. Syphon tube assembly, comprising MP numbers 1587, 1588, 1596, 1597, 1598, and 1599.


MP 1792, ZONE A-4
MP 1791, ZONE C-4
MP 1794 ZONE B-6
MP 1795, ZONE D-6
MP 1796 3/8" DIA. X 5 1/4" STEEL ROD BENT TO FORM RING AND WELDED TOGETHER TO HOLD GRAB HOOK SECURE
3/8" NO. 2 GRAB HOOK
3/8" CLOSE LINK CHAIN UNION NO. 386571 30" LONG
1/2" CHAIN SHACKLE WITH SCREW PIN
2"-600 LB. CAST STEEL CRANE GATE VALVE NO. 3607 W
2" ABANDONING NIPPLE
MP 1792, ZONE E-5
MP 1793, ZONE E-5
1/4" X 1/2" BOLTS WITH NUTS
METAL COUPON 1/16" X 1" X 6"
3/4" - 300 LB. CRANE BRASS GATE VALVE NO. 382-P
1 1/2" E.S. PIPE, 25" LONG, DRILLED AND CENTERED ON SYPHON
MP 1598, ZONE D-6
3/16" X 1 1/4" COTTER PIN
MP 1588, ZONE D-6
MP 1587, ZONE B-5
2 1/2" OD PULLEY
MP 1599, ZONE D-3
1" O.D. X 73" I.D. SHELBY STEEL TUBING 54" LONG
AFTER ASSEMBLY IN PACKING BOX PLACE 3/4" COUPLING ON THIS END TO ACT AS STOP

Control Underground Corrosion at Lower Cost



Where and why corrosion occurs

How buried Anodes control corrosion

Types of Alcoa Anodes

How to install Anodes

Where to get Alcoa Anodes

HERE'S THE TECHNICAL STORY ON
Underground Corrosion
By far the most prevalent type of corrosion on buried metal is electrochemical.
As hundreds of spots over the buried metal small differences of electrical potential form local anodes and cathodes, or tiny batteries. Several conditions can cause these batteries to be developed: Variations in the composition of the earth around the metal, breaks in the mill scale on the metal, different concentrations of dissolved oxygen around the metal, "holidays" in coatings and many others.
If all the anodes are eliminated by maintaining the entire surface of the structure to be protected as a cathode, there will be no electrochemical corrosion on that structure. This can be done by applying current to the structure from an external source.
Cathodic protection is simply a technique of impressing, from a direct electrical source such as a galvanic anode, a direct electrical current through the soil or water to the surface of a buried metal structure.

ALUMINUM COMPANY OF AMERICA
680 L GULF BUILDING
PITTSBURGH 19, PA.

Please send me a copy of "Magnesium Anodes by Alcoa" on the control of underground corrosion.

NAME_____

POSITION_____

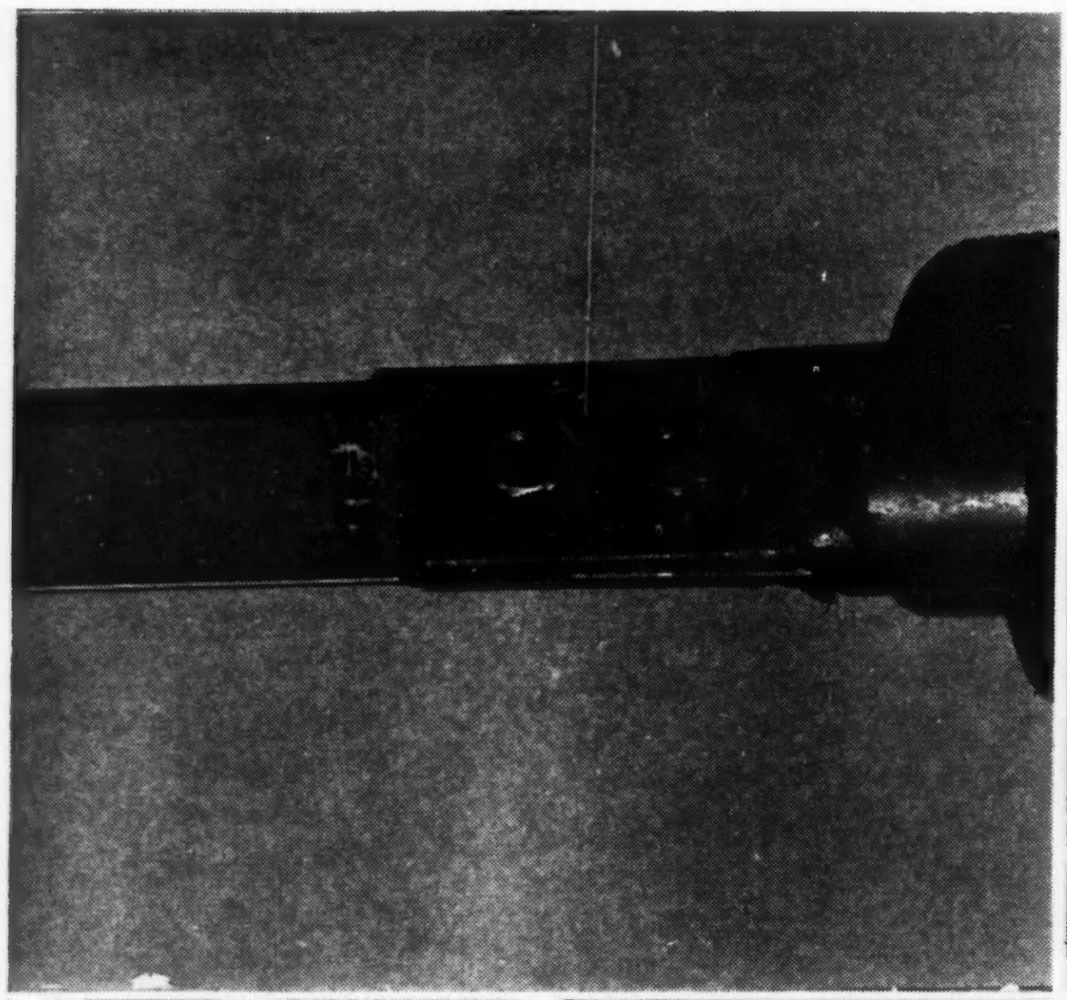
COMPANY_____

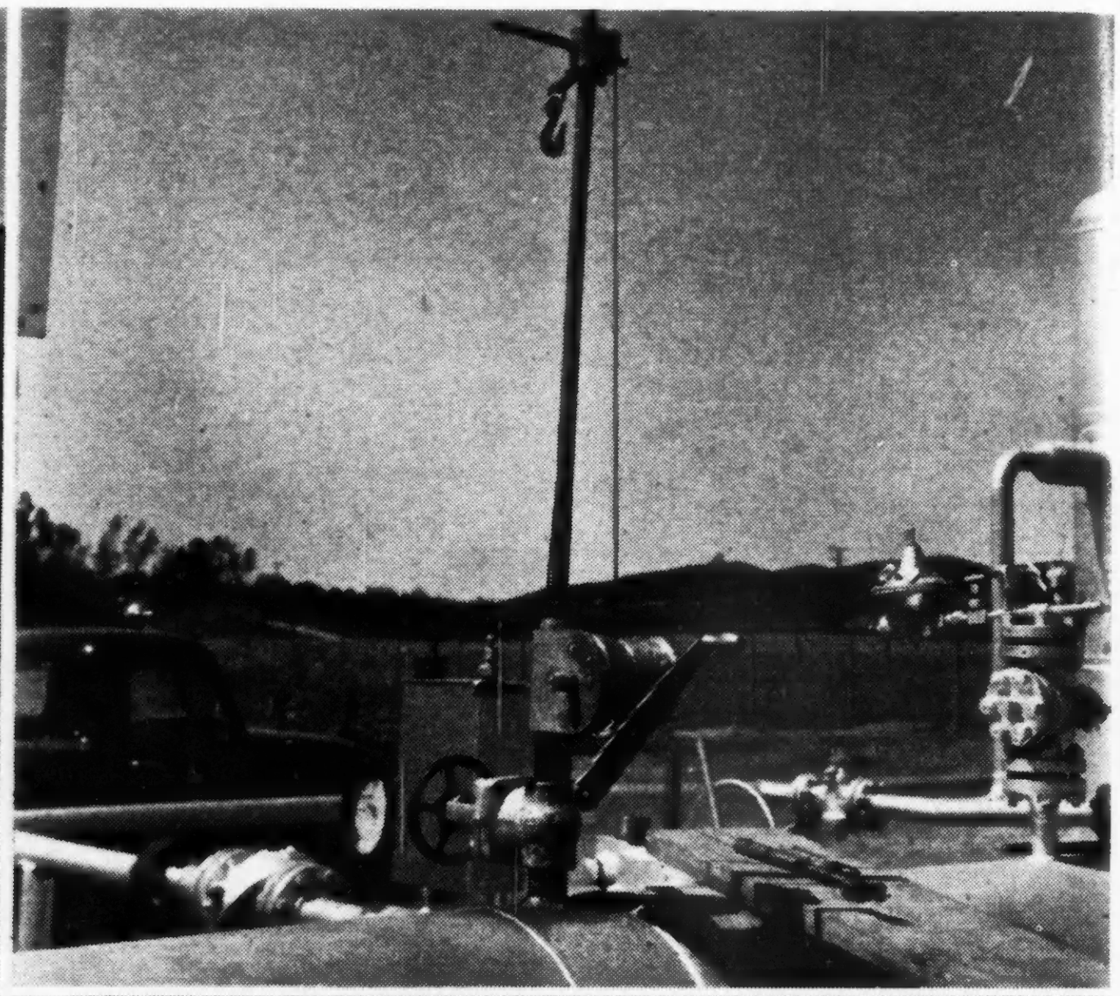
ADDRESS_____ STATE_____

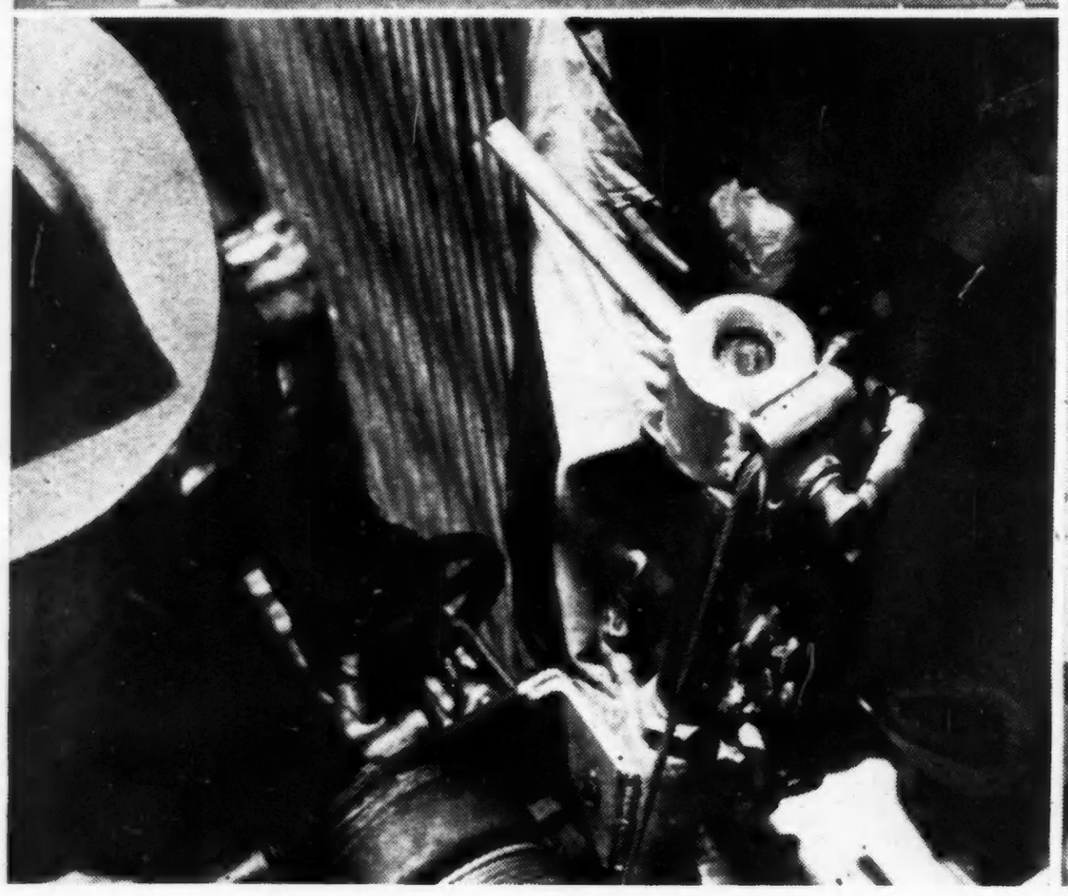
CITY_____

ALCOA
ALUMINUM

ANODES by ALCOA







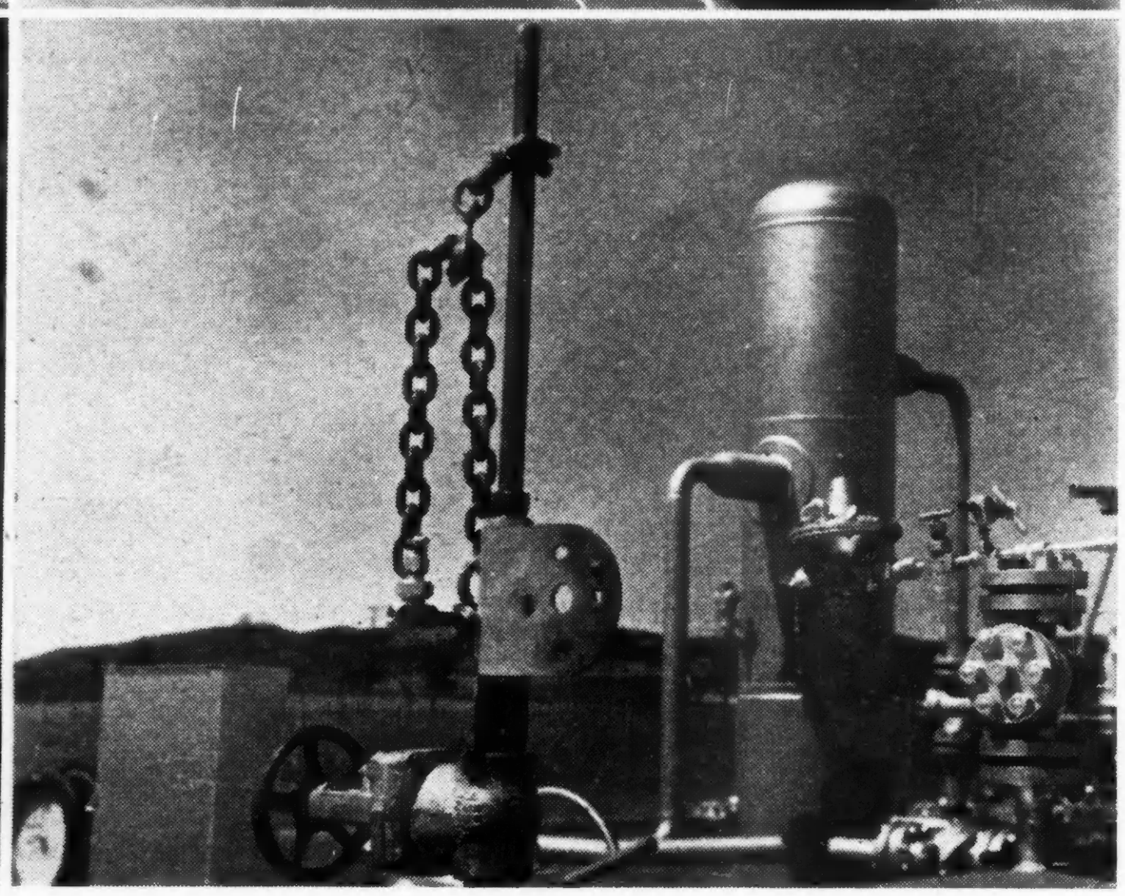


Fig. 12. Detail showing method of attaching corrosion coupon to 1 1/16-in. OD tubing.

Fig. 13. Equipment in place ready to insert coupon.

Fig. 14. Inserting coupon—note bomb-hoist used to lower coupon.

Fig. 15. Coupon in place. Bomb-hoist has been removed: tubings held by heavy chain.

inserted into the line to any desired position. A cross section of the inserting equipment is shown in *Fig. 8.*

Inserting Equipment

The equipment consists of a stuffing box made from double extra strong 2-in. pipe. The corrosion coupon is steel and measures 1/16-in. x 1 in. x 6 in. It is attached to a length of 1 1/16-in. OD steel tubing which extends through the stuffing box. The tubing is inserted into the line by means of a pulley arrangement and a Douglas bomb hoist. After the tubing has been lowered to the desired position, it is locked in place by means of a chain, and the bomb hoist and pulley assembly removed. This procedure is illustrated in *Figs. 10* to *15.* Periodically the test coupons are removed, examined, and weighed and then reinserted. If it is no longer necessary to use the tap on the pipe for this purpose, the abandoning nipple can be plugged and capped and the gate valve removed.

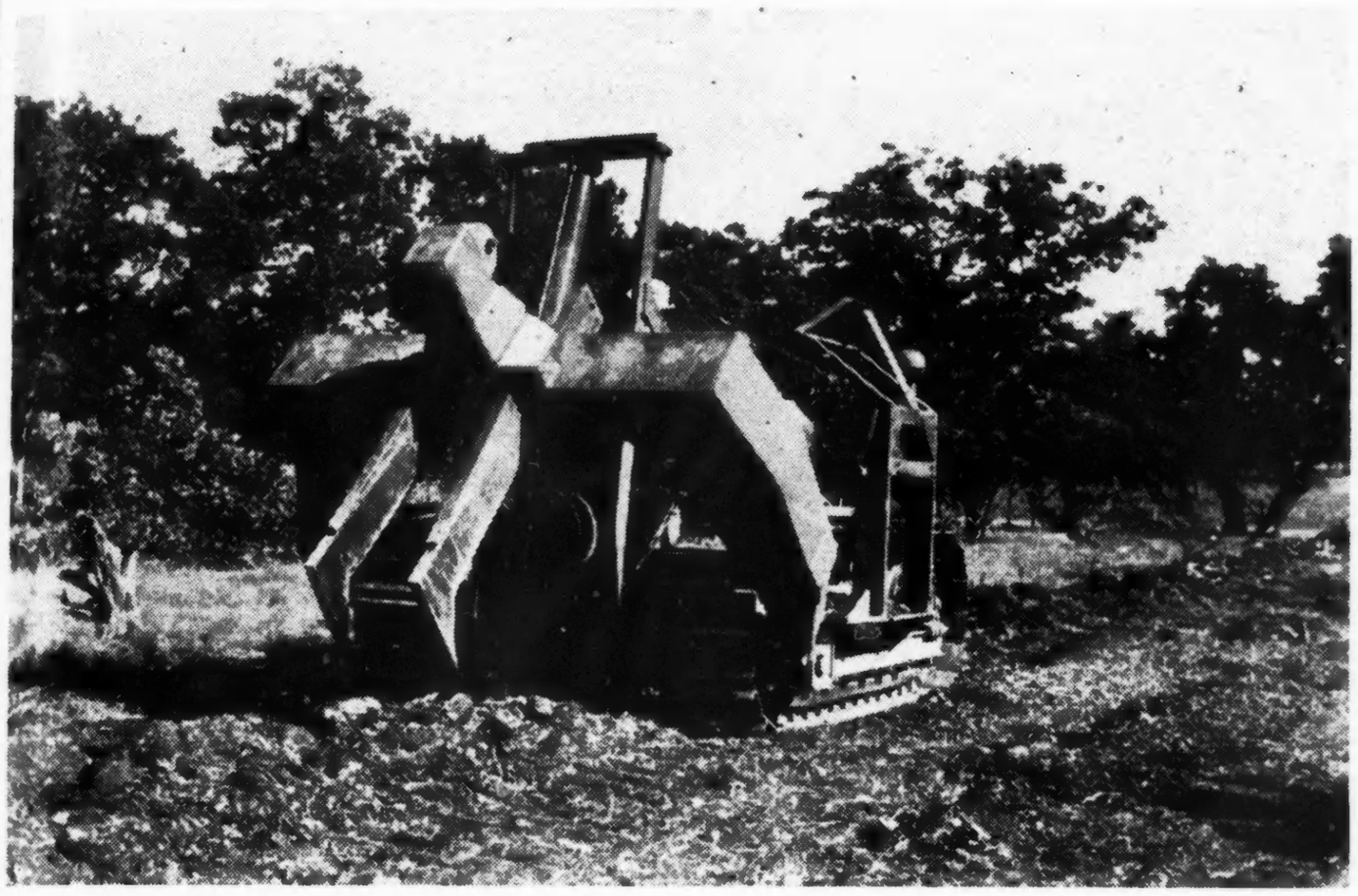
Siphon Drip

The same equipment used for inserting test coupons can also be modified to provide a high pressure syphon drip. A 1 1/16-in. OD syphon tube as shown in *Fig. 9* is substituted for the tubing holding the test coupon.

As mentioned previously, certain relatively short sections of the line were hydrostatically tested after construction and before the line was placed in operation. After the test was completed, the water was drained from the line with syphons extending through 2-in. abandoning nipples installed on top of the pipe. Because of the flat gently rolling terrain in one of these sections, it was impossible to remove all of the water. After the line was placed in operation, the flow of the gas moved the small volume of remaining water into the lowest points. It was then a simple matter to temporarily install the high pressure syphon drain on the existing abandoning nipples and remove the water.

At the time this line was constructed, it was the largest diameter line operating at pressures over 800 psig. It has been found that with properly designed equipment, more or less conventional methods can be used to safely operate and maintain the system.

PIPELINE OPERATING IDEAS & EQUIPMENT



'Rooter' Loosens Ditch Obstacles

New piece of equipment now in use by Lone Star Gas Co.'s pipeline department is a "rooter" which some pipeline men have named "the plow." It was constructed on a TD 18 Caterpillar tractor and is operated from the seat of the cat. The device was built by the K. N. and W. Equipment Co. of Irving, Texas, in the Lone Star territory, and is the first one of its kind.

Talked into trying it, Lone Star now plans to keep it and possibly buy another one.

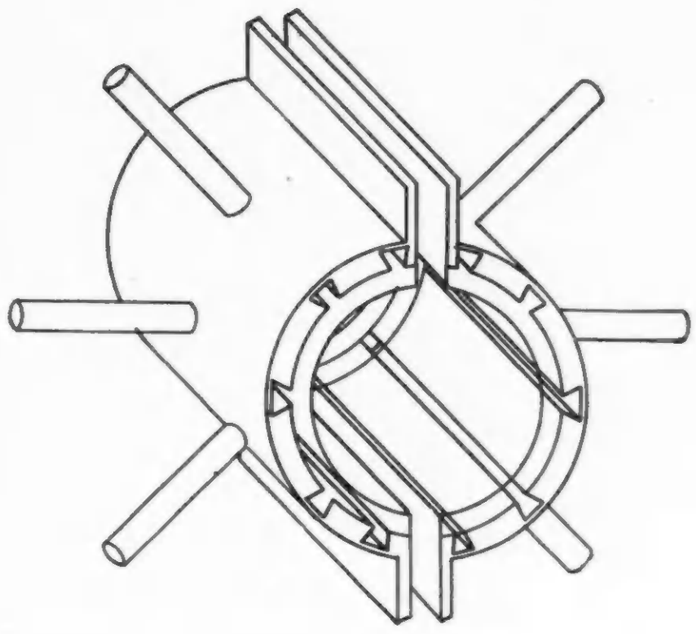
Blades are 42 in. long, 10 in. wide and 2 in. thick. They automatically dig into the soil along the ditch ahead of the ditching machine to loosen heavy rock, cut into roots and loosen the soil.

Photo above shows the machine with blades up. When they are lowered, they rip the earth loose along the line of the ditch to be dug. With blades partially raised, the "rooter" can be used as a bulldozer, and is often employed to shove trees, boulders, or other obstacles out of the way. Thus crews can blast trees, move them out of the right-of-way, and loosen and cut the roots in a quick operation, without having a regular bulldozer on the ditch- digging job.

Crank Pin Polisher

Polishing crank pins and bringing slightly flat pins to a true circle are accomplishments claimed for this special tool devised by Floyd E. Snider, station department, Hope Natural Gas Co., Clarksburg, W. Va. These jobs may be done without removing the bearing journals from the engine.

Length of the tool should be ½ in. less

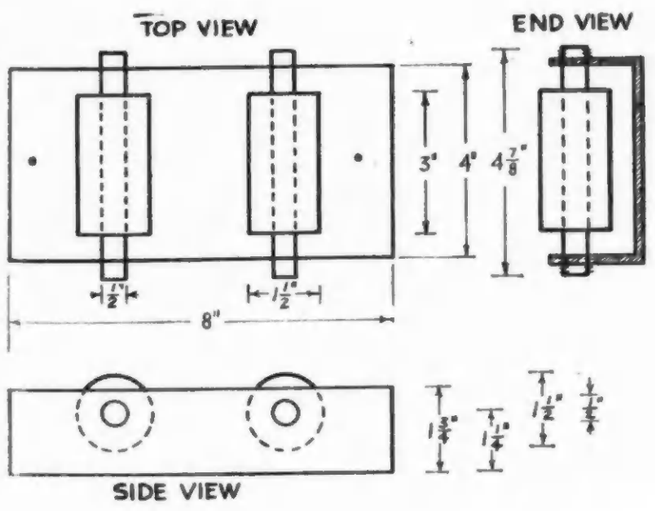


than the journal length to permit side motion as well as rotating motion. Six 1-in. handles of good steel which will withstand a strong pull are fastened on the tool for turning. Emery cloth is fastened on each side of tool, which is lined with babbitt and bored to desired size, allowing for the thickness of the emery cloth. Cloth should be coated with white lead, mixed with oil, when the machine is to be used.

Protruding joints A,B,C,D are ⅝-in. thick, extending out 2 in. all the way along each half, and are drilled at a position 1 in. from each side, threaded in the opposing side to receive ⅝-in. tension bolts, the holes to be ½ in. from outer edge. A space of 1 in. is left between the faces of A-B and C-D when the tool is bored. A ¼-in. plate, extending through the inner side of the protruding joint, attached by four cap screws, holds the emery cloth in place.

Overhauling Speeded By Piston Rollers

The task of turning pistons to clean or check 7¼-in. rods with a dial indicator has

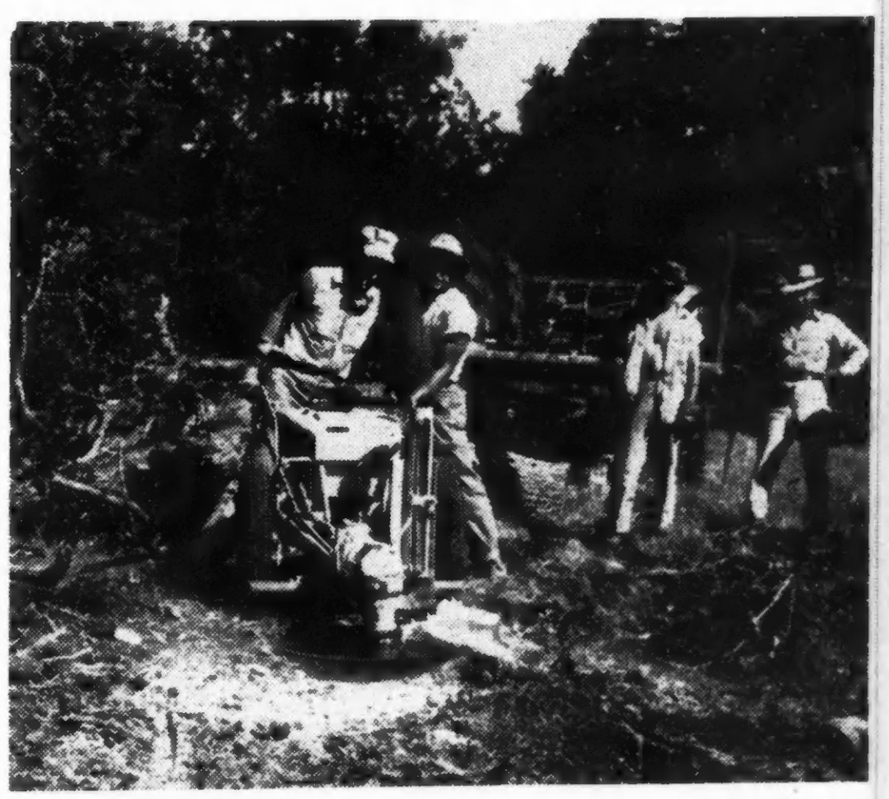


been simplified with these piston rollers, designed by W. F. Burke, maintenance mechanic at Panhandle Eastern Pipe Line Co.'s Haven compressor station. The device has been used in overhaul for some time at the plant. It is claimed that the turning of this piston using the rollers is made easier than with the method previously used in which the wood bearing or segment of packing ring was used.

The equipment consists of two pieces of 4-in. channel iron with brass rollers.

Power Saws Used

Motorized saws are used on the Lone Star Gas system for right-of-way clearing. Lone Star uses four of these at the present time in pipeline construction work. The saws are a product of the Tree Feller Corp. of Dallas. This one was in operation on the east leg of Lone Star's new line into the southwest Texas hill country.



PIPELINE NEWS

1000 Persons Attend Kansas Line Opening

Ulysses - Kansas City pipeline increases Cities Service capacity to 1300 MMcf

More than 1000 persons, including governors, mayors of cities, business men and gas company officials, attended the formal opening on Oct. 12, of the 405-mile 26-in. Cities Service Gas Co. pipeline extending from Ulysses, Kan., in almost a straight line to Kansas City.

The line cost in excess of $31 million; this will be boosted by $5 million when compressor station enlargements and other extensions are made. It increases by 50% the capacity of the Cities Service Gas system's lines supplying cities in Kansas, Missouri and Nebraska, which previously was between 630 MMcf and 650 MMcf daily.

Dedication ceremonies were at Lenexa, Kan., 21 miles southwest of Kansas City. Following a barbecue picnic lunch, Gov. Frank Carlson of Kansas whirled the gate valve at the South Glavin Junction regulating station, starting the gas flowing from the 26-in. line into the Greater Kansas City distributing area.

Assisting in the ceremony were Gov. Roy J. Turner of Oklahoma, Mayor William E. Kemp, Kansas City; John H. Hendren, Jefferson City, representing Governor Forrest Smith of Missouri: S. B. Irelan, Oklahoma City, president, Cities Service Gas Co., and W. Alton Jones, New York City, president, Cities Service Co.

The line was connected several weeks ago and tested 900 psi. This test was made upon completion of the 26-in. line from near Hutchinson, Kan., extending 130 miles to Ottawa, Kan. The Ottawa-Kansas City sector was constructed during the summer of 1948. (See *GAS,* Feb., 1948, p. 46; Oct., 1948, p. 65; Feb., 1949, p 43.)

The project was started in war days when the company secured priorities, purchased the steel, and had it made into pipe. War industries were then clamoring for gas. Defense plants were taking the steel, skilled and common labor and materials were scarce, and transportation of pipe and other materials was slow.

Smith, ConWes Build Houston Mills

Two new sources of welded steel pipe gas gas transmission lines in the Southwest were promised last month when A. O. Smith Corp., Milwaukee, and Consolidated Western Steel Corp., Los Angeles, announced plans to build mills in Houston.

The Milwaukee firm has joined with Sheffield Steel Corp. to form a new company- –A. O. Smith Corp. of Texas— which will build and operate a $5 million plant. Claimed to be the second largest mill in the country for the production of welded pipe, the Smith plant will have a capacity of from 30,000 to 35,000 tons of pipe per month, ranging in diameter from 8⅝-in. to 30-in. and larger if required.

Steel for the plant will be provided by Sheffield Steel, which is located on adjacent property. Construction of the plant was scheduled to start immediately and was expected to be in operation by next summer. Typical of the equipment which will be used to turn out pipe in the new plant are the powerful presses shown in the photograph, which make a tube out of the flat skelp in three steps: U-ing, crimping and closing.

Consolidated's plant is expected to go into operation in the spring of 1950 with facilities which will provide an annual capacity of 100,000 net tons of 24-in. and larger electric welded and expanded steel pipe.

New Bid for Natural

Another entry in the competition for the right to distribute natural gas in New England made itself known last month when organization of the Algonquin Gas Transmission Co. was announced.

Set up by the New England Gas & Electric Assn., Providence Gas Co., and Eastern Gas & Fuel Associates, the company has authorized Ford, Bacon & Davis Inc., New York, to make a study to determine the most favorable method of obtaining natural gas for utilities and their customers. The investigation is expected to be completed very soon. If it proves favorable, application will be made to the FPC.

Northeastern Gas Transmission Co. had previously announced plans to build a line to serve New England and has several contracts in its pocket.

TGT Wants Own Loop To Sub for United

Tennessee Gas Transmission Co., Houston, has asked FPC's permission to construct additional horsepower and a 24-mile, 30-in. loop which would carry from the Carthage field through the company's Carthage transmission line to its main transmission line 111 MMcf per day.

This volume is now being transported for Tennessee by United Gas Pipe Line Co. through its own Carthage line, under a 3½-year-old agreement. Approval of the line is contingent upon a cancellation agreement between Tennessee and United.

Tennessee estimates that the additional facilities will up capacity of the Carthage line by approximately 50 MMcf per day, making a total of 250 MMcf, and it will increase capacity of the main line between stations Nos. 5 and 6 sufficiently to transport the additional 111 MMcf.

New Lines for Pittsburgh Area

A $51,000 construction program in the suburbs south of Pittsburgh has been undertaken by The Manufacturers Light & Heat Co. to step up natural gas service in Dormont and in the northern part of Mount Lebanon.

About 3400 ft of 6-in. high pressure distribution main and 2000 ft of 8-in. low pressure line are being laid.

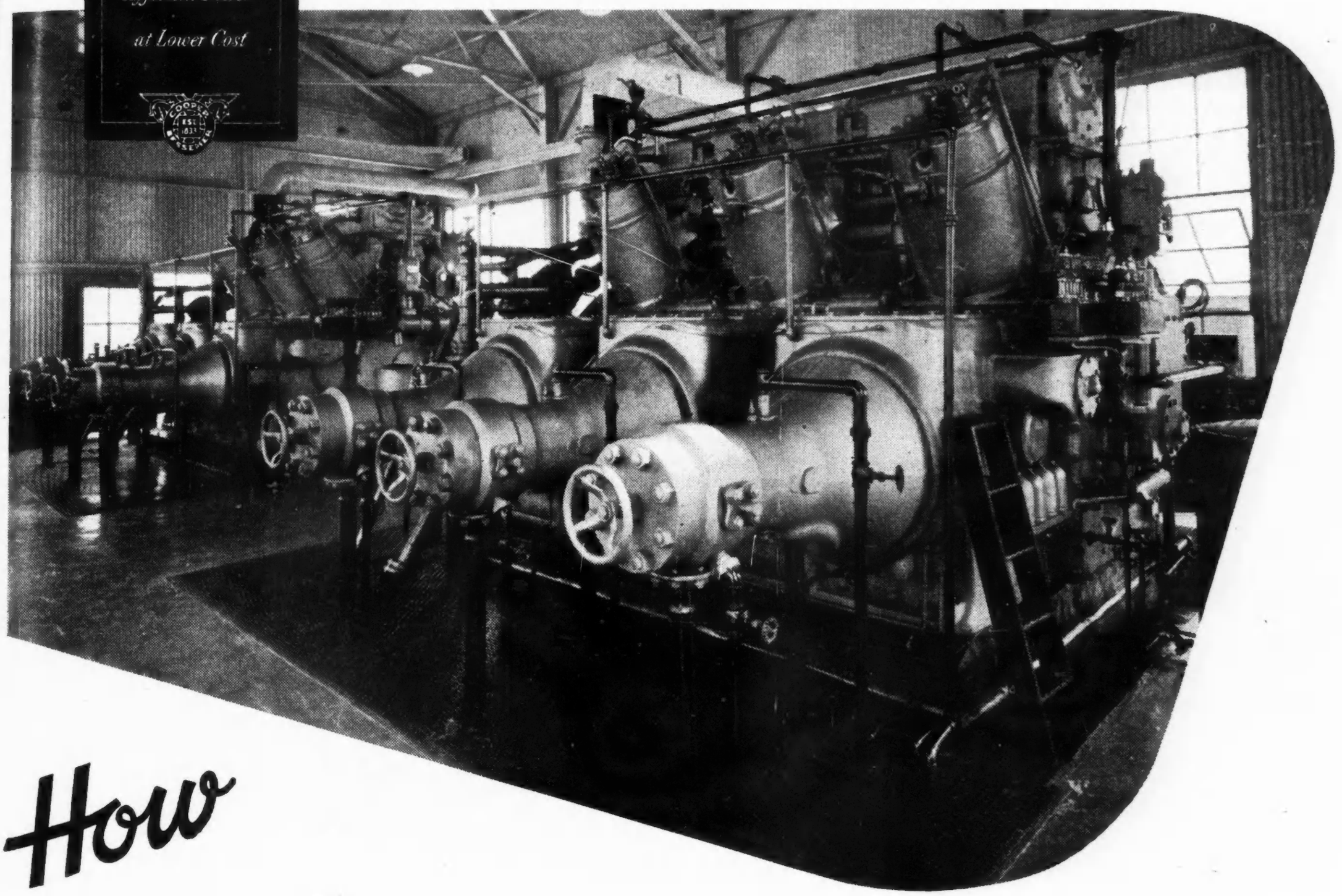
Loop Laid in Alliance

Construction which when completed will entirely loop the city of Alliance, W. Va., was started Oct. 1 by Natural Gas Co. of West Virginia.

Improved natural gas pressures for customers in Alliance were expected to result from the project, which will cost about $36,000. Six-inch high pressure distribution pipeline is being laid.

Another Example of Efficient Power at Lower Cost

These two 6-cylinder GMV's provide 1200 compressor horse-power at Western Natural Gas Company's 3-well, Goebel Field cycling plant. Currently compressing 15,000 Mcf of gas daily, from 1,500 to 3,500 psi, units have capacity for 30,000 Mcf to meet anticipated increases in volume of gas to be handled.



How GMV compactness and durability pays off

for Western Natural

The two Cooper-Bessemer GMV compressors you see here have outlived the cycling requirements in one field . . . and are now doing an efficient job in a new location. Installed eight years ago at Edinburg, Texas, they were recently transferred by Western Natural Gas Company to handle the compressor requirements at their new Goebel cycling plant in Live Oak County, Texas.

This "case history" is significant. First, it testifies to the long, efficient life of these modern Cooper-Bessemer V-angles — units that obviously are ready for many more years of trouble-free, low-cost operation. Secondly, it emphasizes the advantage of GMV compactness — compressors that are installed, housed, operated and maintained at exceptionally low cost.

Cooper-Bessemer V-angles, long-lived, unusually compact, are built in three types for all compressor needs from 200 to 2400 bhp. Let Cooper-Bessemer prove to you how these modern units can add to your profits.

The **Cooper-Bessemer** *Corporation*

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New York City Washington, D. C. Bradford, Pa. Parkersburg, W. Va.
San Francisco, Calif. Houston, Dallas, Greggton, Pampa and Odessa, Texas
Seattle, Wash. Tulsa, Okla. Shreveport, La. St. Louis, Mo. Los Angeles, Calif.
Caracas, Venezuela Gloucester, Mass. Calmes Engineering Co., New Orleans, La.

El Paso Tries Again For Texas - California Okay

El Paso Natural Gas Co. will have another try at getting FPC approval for its proposed 451-mile pipeline from the San Juan Basin in New Mexico, Colorado, Utah, and Arizona to a point near the California border when hearings in the reopened case start Jan. 4 in Washington, D.C.

The Texas company, which wants to deliver 150 MMcf at the border for delivery to Pacfic Gas & Electric Co., San Francisco, is already under way with construction of a line to pipe 250 MMcf from the Permian Basin to PG&E. The San Juan application, which had been proposed in the same proceedings as the approved line, was severed last March when the commission approved the Permian Basin pipeline.

The commission reopened the proceedings July 14 to permit El Paso time to make an adequate showing that it had sufficient reserves to meet the additional demands. A joint requesst was made Sept. 27 by PG&E and El Paso for further hearings.

Construction of the 451-mile line originally was proposed by San Juan Pipe Line Co., an affiliate of El Paso, but El Paso now wishes to construct the line as part of its own system. The application of PG&E to receive the gas, which would increase to 400 MMcf its total take from El Paso, depends upon the final disposition of the El Paso application.

Temporary Okay Given United Loop to Serve Mississippi

A loop line in Louisiana 105 miles long, which will increase United Gas Pipe Line Co.'s deliveries of natural gas to Mississippi River Fuel Corp. to approximately 195 MMcf per day, will be constructed under temporary authorization granted by the FPC last month. A formal hearing opened later in the month in Washington for further consideration of the plan.

The $5 million program includes a 20-in. loop paralleling United's existing 24-in. Carthage, Texas, to Sterlington, La., pipeline. Mississippi recently elected to exercise its sales agreement rights to receive added gas from United to compensate for decreased deliveries from other sources.

The commission at the same time denied intervention petitions submitted by railroad and coal interests, the United Mine Workers, and Tennessee Gas Transmission Co., the last named holding that United's proposals raised questions relative to continuing a transportation agreement which Tennessee has by which United transports over its Carthage-Sterlington line 116 MMcf per day. Tennessee has proposed to construct its own line and thus free this capacity for United to carry the added gas to Mississippi River. United, however, states it has no intention of cancelling the contract with Tennessee.

Aluminum Pipeline Sought

A proposal to substitute aluminum alloy pipe for steel pipe has been submitted by Alabama Tennessee Natural Gas Co., Florence, Ala., to the FPC. The substitution would be made on a 9500-ft section of lateral line previously authorized by the commission which will be used to serve the Reynolds Alloy Co. at Listerhill, Ala.

The pipe will have the same diameter and capacity as the steel pipe previously authorized, and while it will increase the cost by approximately $6300, the company said it felt that the considerations of reduced future maintenance and longer service life will materially offset the higher initial cost.

Buchanan Balks But Transfer Of Jersey Line Approved

The acquisition of approximately 24,000 ft of 8-in. line in New Jersey from Public Service Electric & Gas Co., Newark, has been approved by FPC for Texas Eastern Transmission Corp. Texas Eastern plans to operate the line as part of its main transmission system to make deliveries and sales of natural gas to Public Service.

The line has a maximum capacity of 10 MMcf per day. Last February the commission ordered Texas Eastern to deliver up to 4.5 MMcf to the utility, and Public Service subsequently constructed the section of line for the purpose of receiving gas from Texas Eastern.

Commissioner Thomas C. Buchanan strongly objected to the decision on the basis that the finding of the commission "fastens on other consumers of Texas Eastern's the capital and operating cost of a line constructed by and for the sole convenience of Public Service." Mr. Buchanan feared that the decision would serve as precedent for other stub line acquisitions. He charged that the transfer was approved for the sake of avoiding a decision as to whether Public Service would or would not be a natural gas company.

Mississippi Drops Plea For Louisiana - Illinois Line

Another entry in the race for a new Midwest gas line was scratched last month when Mississippi River Fuel Corp. dropped its application for a 650-mile line it had planned to run from Louisiana to northern Illinois.

This is the second application for a line that had to be abandoned after Texas-Illinois Natural Gas Pipe Line Co. announced plans to build a 1018-mile line from around Houston to Joliet, Ill., last August. Both Mississippi and Gulf Coast Northern Gas Co. had intended to serve the Natural Gas Pipeline Co. of America and Chicago District Pipeline Co., which will be served by the Texas-Illinois line if and when it is approved.

Mississippi's system would have cost $90 million and would have increased delivery capacity by 500 MMcf per day. Deliveries to the St. Louis area, as well as to the Chicago territory, would have been upped.

East Ohio To Store In Four More Fields

Conversion of six natural gas producing pools in Medina, Lorain, Richland, and Hocking counties, Ohio, to underground gas storage was authorized by the FPC last month, enabling Ohio Fuel Gas Co., Columbus, to boost its storage by 16.6 billion cu ft. The added capacity will bring the total ultimately to about 59.3 billion.

The company will also construct about 60 miles of line to be used in connection with the storage and will retire about 53 miles of existing well and field lines. Total cost is estimated at $1 million.

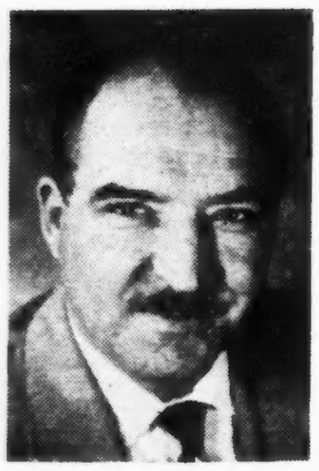
The net result will be that Ohio Fuel will be able to store large quantities of out-of-state gas to replace declining production in local fields.

Pipeline People

O. W. Gaudern

OWEN W. GAUDERN, former assistant manager of purchases for The Fluor Corp. Ltd., Los Angeles, has been promoted to manager of purchases for the firm. Mr. Gaudern entered the purchasing field with the Neilan Co., Los Angeles. In 1934 he became associated with Fluor and a year later was transferred to the purchasing department. One of Mr. Gaudern's successful assignments for the company was the Shell Oil Co. project at Vancouver, B.C., in 1946.

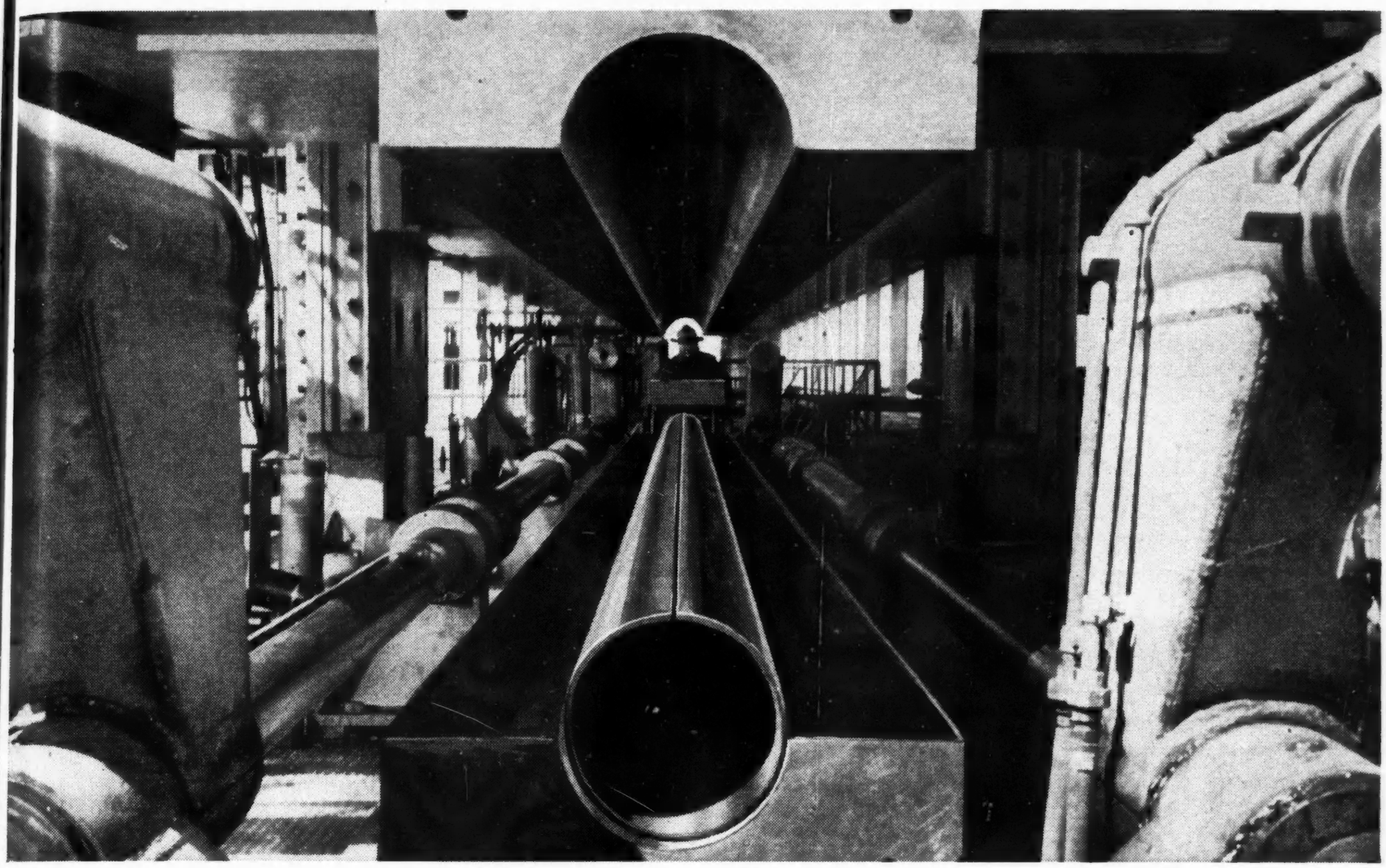
RONALD L. McVEY, controller of Tennessee Gas Transmission Co., Houston, has been elected president of the Houston control of the Controllers Institute of America. JOHN B. COOKENBOO, Houston Natural Gas Corp.'s controller, has been chosen vice president of the local group. In Kansas City NORMAN F. PAXTON, assistant secretary and assistant treasurer of Panhandle Eastern Pipe Line Co., was re-elected treasurer of the local control. LOUIS G. JAMES, general auditor of Lone Star Gas Co., Dallas, and JOHN A. PATERSON, Brooklyn Union Gas Co.'s comptroller, have been elected directors in their respective cities.



H. Gottwald

R. L. McVey

H. GOTTWALD has been appointed assistant sales manager for Nordstrom Valve Division, Rockwell Manufacturing Co., Pittsburgh. Mr. Gottwald has been identified with the firm's valve operations since 1928 and for the past several years has handled Rockwell's export operations in South America. He will headquarter in Pittsburgh.



Two minutes ago this pipe was steel plate

In that short time a 40-foot, pickled plate of Kaiser Steel is crimped, U-ed—then cold pressed into shape in this giant press.

Now, with its straight edges perfectly aligned, the pipe is ready for welding. Then it will go into a rounding machine which improves physical properties through cold reduction.

After beveling and hydrostatic testing, this high quality steel line pipe will be ready to go to work for you.

Sizes up to 30 inches

Kaiser Steel line pipe to latest API specifications — *in sizes up to 30 inches*—is now available from Kaiser Steel. Shipping points are Fontana and Napa, California.

Every length is produced by experienced, highly skilled personnel . . . with quality rigidly controlled at every step.

It's good business to do business with

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications					
	Type	**Diameter**	**Length**	**Wall Thickness**	**Shipping Point**
Prompt deliveries on the following:	Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
	Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
	Electric Resistance Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Now on order—delivery 1st quarter, 1950	Electric Resistance Weld—Plain End	5 9/16" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
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Alberta Export Permit Hearings Adjourn

The long-debated question of whether Alberta's gas will be exported to the northwestern United States in the foreseeable future remained a moot point last month when the Board of Transport Commissioners adjourned a hearing on the application of Westcoast Transmission Co. Ltd. to build a natural gas line into Vancouver.

The adjournment followed refusal by the board to grant an application for the line to run from northern Alberta to Vancouver and across the border to Portland, Ore., and Seattle. The board decided that the company had not shown there were sufficient reserves to support the line and decided to adjourn hearing until Dec. 12.

The company then asked permission to run that section of the line from inside British Columbia to Vancouver and across the border, but action on this request was also held in abeyance.

Western Find Shows Promise

A possible new source of natural gas for the San Francisco bay area was reported recently when Buttes Oil Fields Inc., owner of the Marysville Buttes natural gas field and lessee of 10,000 acres in the new Corning gas field in California, revealed plans to insure a total daily delivery of 80 to 100 MMcf.

The three presently producing wells in the area yield a combined flow from two sands of 33 MMcf per day, and company directors predict that a pipeline to the bay area may be warranted in the future.

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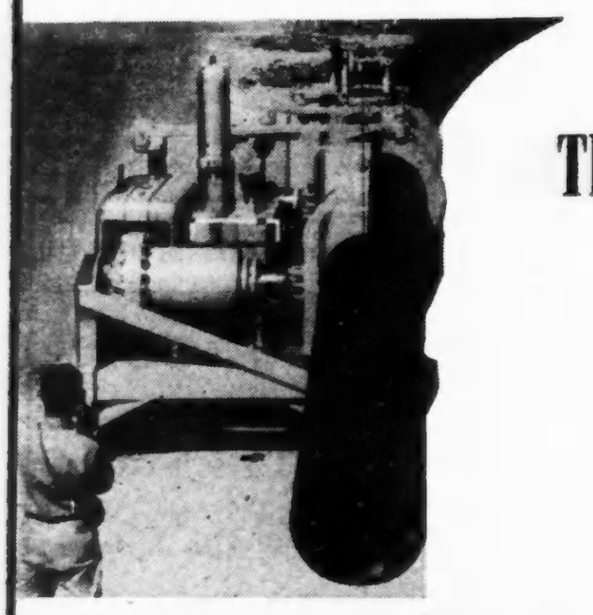

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Mississippi Asks Boost To Aid Tri-State Sales

Mississippi River Fuel Corp., St. Louis, has requested FPC permission to increase daily sales capacity of its system to 328 MMcf through the addition of compressor units in Louisiana, Arkansas, and Missouri.

Installation of 13,000 hp in three new stations and of 3000 hp in two previously authorized stations is planned (1) to meet increased demands of existing customers, (2) to deliver natural gas for distribution in 29 Arkansas and Missouri communities now without natural gas service, and (3) to connect additional main line customers who will use natural gas for industrial purposes in the three states.

The three new stations would be built by an unnamed third party at a cost of $2.5 million and leased to Mississippi River Fuel. Cost of additional horsepower in existing stations would be $570,000.

Earlier in September the Arkansas Public Service Commission approved an application of Fort Smith Gas Co. to build facilities to receive gas from Mississippi River Fuel Corp. for distribution in the vicinity of Pocahontas, Ark.

Ohio Portion of Inch Expansion Complete

All construction work in Ohio necessary to make deliveries this winter under its expansion program was completed by Texas Eastern Transmission Corp. last month. When the entire program is finished, capacity of the Big Inch lines which it operates will be boosted to 740 MMcf per day. After this winter, an additional 55 miles of pipe will be laid in Ohio and additional compressor station facilities will be installed.

Work has been started on one section of 20-in. line in Louisiana which will loop the Little Inch and on which completion of construction is contemplated before 1950. Other parts of the program which will be undertaken next year include a 20-in. loop in Texas and 100 miles of 16-in. line from Provident City field, Texas, to Baytown, Texas, terminus of the Little Inch.

Inch Link for Jersey Central

A 39.4-mile natural gas pipeline in New Jersey will connect Jersey Central Power & Light Co.'s (Asbury Park, N. J.) coast division system with the Big Inch line. Approval of the $1.2 million plan was given by FPC late in September.

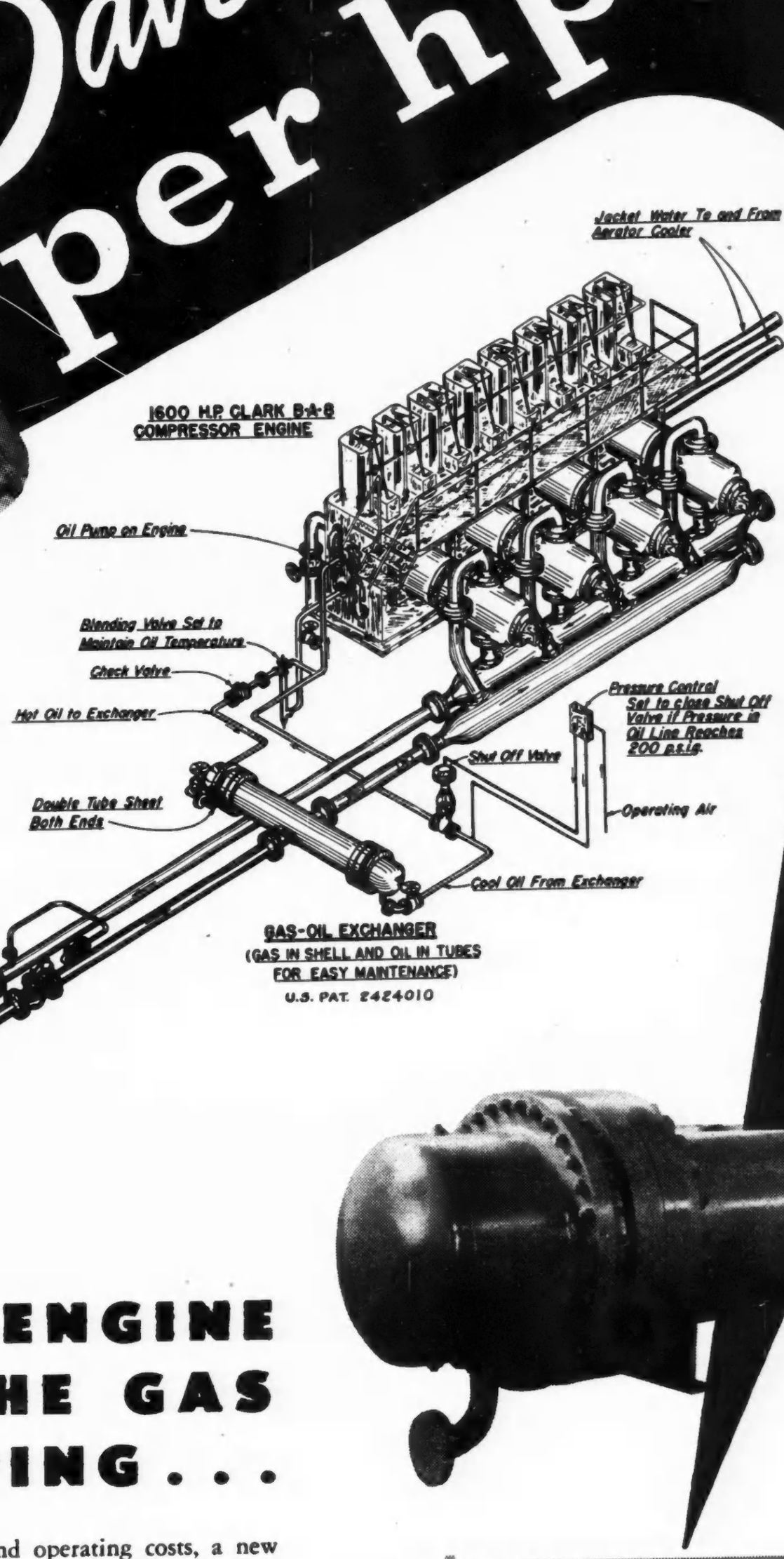
Natural gas received through the 10-in. line will be mixed with manufactured gas at the Long Branch plant for distribution in Monmouth and Ocean counties.

The FPC previously ordered Texas Eastern Transmission Corp. to deliver up to 5 MMcf to Jersey Central, which heretofore has distributed only manufactured gas.

Line to Oklahoma Find

Consolidated Gas Utilities Corp. has started construction of a 14-mile 12¾-in. pipeline to the Elk City, Okla. field, a major discovery in the area. The company recently entered into a contract with Shell Oil Co. to purchase gas from this field.

Save $20 per hp.!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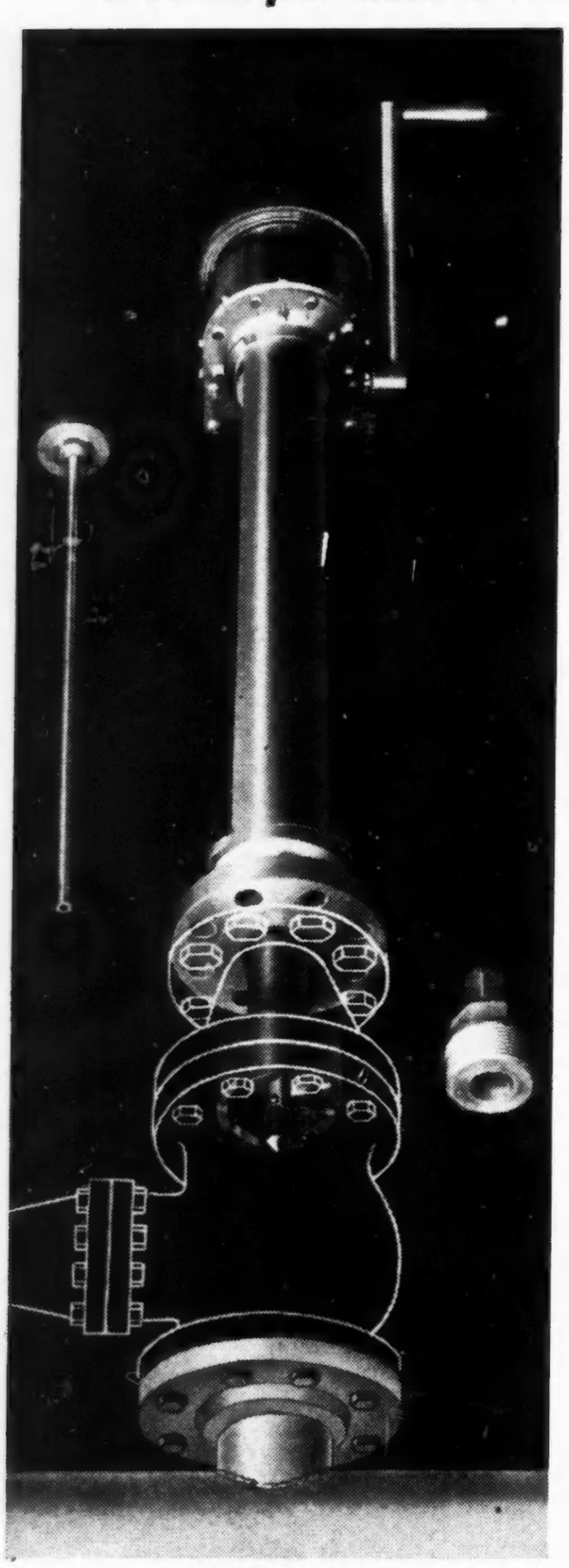

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Kansas Wellhead Price Fix Upheld in Court

Price fixing by the Kansas Corporation Commission in the Hugoton field was upheld in the court of Judge Ray H. Calihan in Garden City late in September. The court found the interim order of Feb. 18 which set the price at 8 cents per thousand to be "lawful and reasonable." This price compares with the average weighted price of 5.35 cents which generally prevailed at the time the order was issued.

The three companies who brought suit—Panhandle Eastern Pipe Line Co., Northern Natural Gas Co., and Kansas-Nebraska Natural Gas Co.—indicated that they will appeal the case to the state supreme court and, if necessary, to the U. S. Supreme Court.

The state based its contention on the question of conservation. General Counsel Jay Kyle pointed out that Hugoton will pass its production peak in 14 years, and the commission feels the placing of a minimum value at the wellhead will conserve natural gas for its "highest and most efficient use."

Court costs in the case were assessed against the plaintiffs.

Pipeline Progress

TENNESSEE GAS TRANSMISSION CO., Houston, has completed 101 miles of 26-in. line from Sharon, La., to the Mississippi river south of Lake Village, Ark. Latex Construction Co., Houston, had the contract, with W. H. Hayes as superintendent. Along its 30-in. loop, TGT also reports 19 miles laid from near Holly Spring, Miss., to near Mississippi-Tennessee state line in September, with completion scheduled before Nov. 1. H. C. Price made three miles on the spread from the state line to near Selmer, Tenn., and Anderson Bros. Corp. laid six miles on the section from near Clay City, Ky., to near Buckeye, Ky. Both of these latter jobs are scheduled for completion in November.

CONSOLIDATED GAS UTILITIES CORP., Oklahoma City, started work in September on a 14-mile, 12¾-in. line from the Elk City, Okla., field to Carpenter compressor station, which was expected to be completed Oct. 15. Frenchie Le Blanc, Shamrock, Texas, contracted the job.

PHILADELPHIA ELECTRIC CO. reports good progress during September and early October on the projects reported last month (October *GAS*, p. 119). Work was 98% complete as of Oct. 1 on the stretches from Travose to Penndel and from Travose to Eddington, 90% complete on the section from Sorrel Horse to Travose, and 75% complete on the Rydal to Sorrel Horse and Chester to the Delaware-Pennsylvania state line.

ARKANSAS LOUISIANA GAS CO., Little Rock, started work Sept. 20 on 163 miles of 20-in. line from Waskom, Texas, to Malvern, Ark. Latex had two spreads on one 91-mile stretch from Magnolia, Ark., to Malvern under E. C. Norris, with headquarters at Arkadelphia, and R. E. Thornton with headquarters at Prescott. Anderson Bros. was building the other section. Steel strikes were holding up pipe deliveries.

SOUTHERN COUNTIES AND SOUTHERN CALIFORNIA GAS CO.'S, Los Angeles, began construction in September on two 20-in. loops along the Goleta pipeline to increase delivery capacity by 40 MMcf. Southern Counties' share of the job, extending from Ventura river to the Santa Barbara county line at Rincon creek, is being built by J. E. Young pipeline contractors. Signal Pipe Line Co. crews started work on Southern Cal's section which extends from a point west of Haskell station in San Fernando valley to Ventura county. The two 17-mile loops will eventually become part of an entirely separate 20-in. line extending from Goleta to Los Angeles.

COLORADO INTERSTATE GAS CO., Colorado Springs, reported 15.7 miles of 20-in. line near Lakin, Kan., 50% complete in mid-October by Contractor R. H. Fulton & Co. M. L. Boyd is spread man. An Arkansas river crossing was reported about one-third complete, with Pat Patterson superintending the job.

OKLAHOMA NATURAL GAS CO.'S (Tulsa) 25-mile, 10-in. line near Watumka was reported 50% complete early in October. Western States Construction Co. was prime contractor and Tulsa Pipe Coating Co., under W. F. Seacrest, was doing the coating.

PANHANDLE EASTERN PIPE LINE CO., Kansas City, reports two of its three pipeline looping projects complete; the third was expected to be completed before Nov. 1. C. S. Foreman & Co. had finished 15 miles of 26-in. line in Missouri, Anderson Bros. Corp. had laid 16 out of 23 miles of 26-in. line in Missouri, and R. H. Fulton & Co. had completed another 10 miles of line in Oklahoma. J. L. Cox & Son had the stringing job on the longer Missouri line under Fred Osterman, foreman. Midwest Constructors Inc. reported work 15% complete early in October on additions to Sunray (Texas) compressor station.

CITIES SERVICE GAS CO., Oklahoma City, which is building a 155-mile line from Selmer, Tenn., to Huntsville, Ala., reports good progress. It expects to have the 10¾-in. Selmer to Muscle Shoals line completed by Nov. 15. Twenty-six miles had been laid by Oct. 10 by Lehman-Hoge & Scott, working at about 1½ miles per day.

NORTHERN NATURAL GAS CO., Omaha, reported in mid-October 30% completion of a 62-mile, 20- and 24-in. line at Garden City, Kan., under R. H. Fulton & Co. Ed Veach was job superintendent. Three other jobs contracted to Fulton include 3000 ft of 24-in. line in Ashland, Kan.; 15 miles of 4- to 20-in. line at Shellytown, Texas; and 6.5 miles of 6-in. line at Beatrice, Neb., none of which has been started. Knupp Construction Co. was expected to complete by Oct. 31, 46 miles of 4-, 6-, and 8-in. gathering lines in the Garden City area.

INTERSTATE NATURAL GAS CO.'S (Monroe, La.) 29 miles of 16-, 20-, and 22-in. line west of Baton Rouge, La., was completed Oct. 5. Latex Construction Co., Houston, under F. L. Silar, contracted the job.

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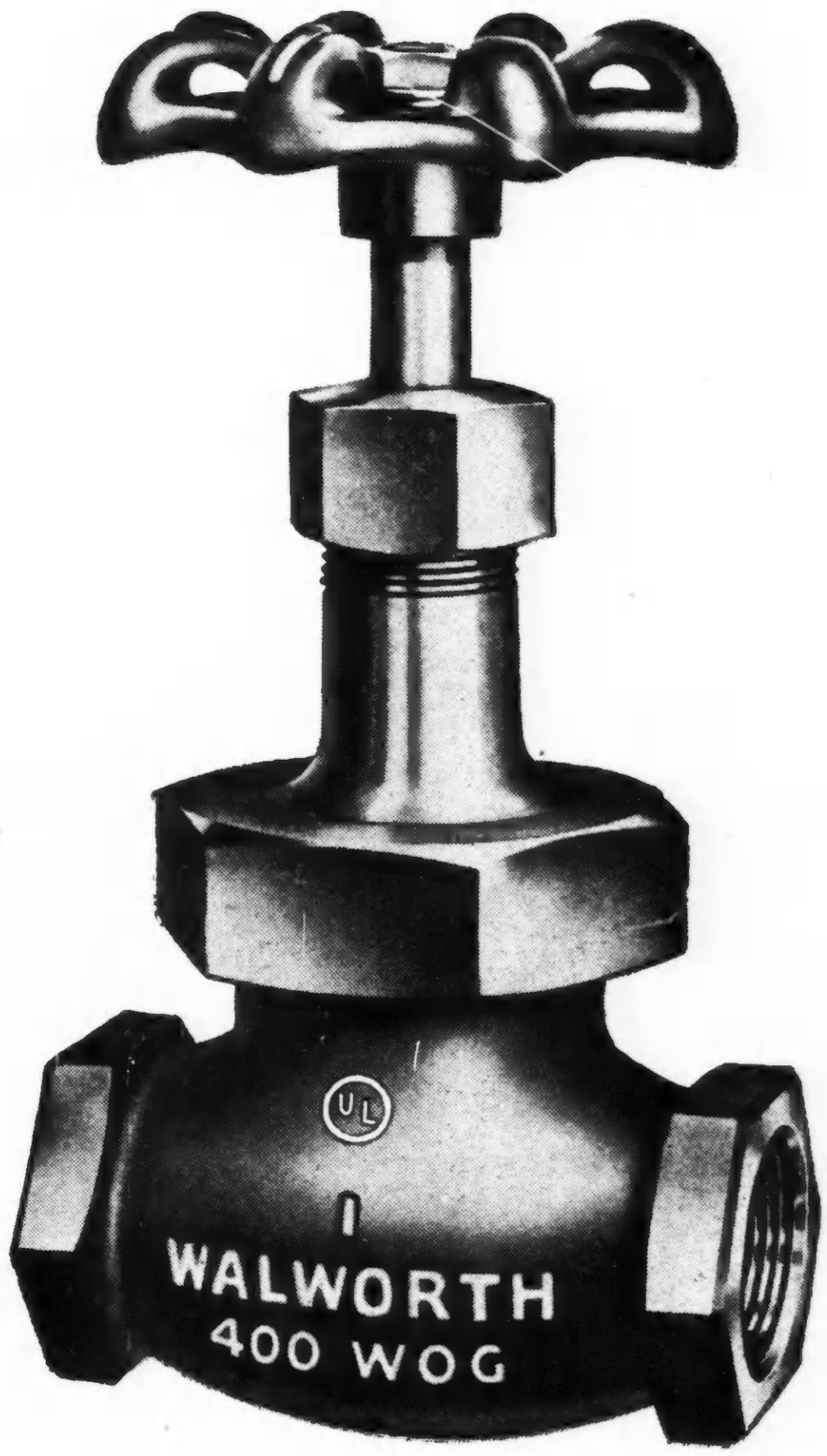

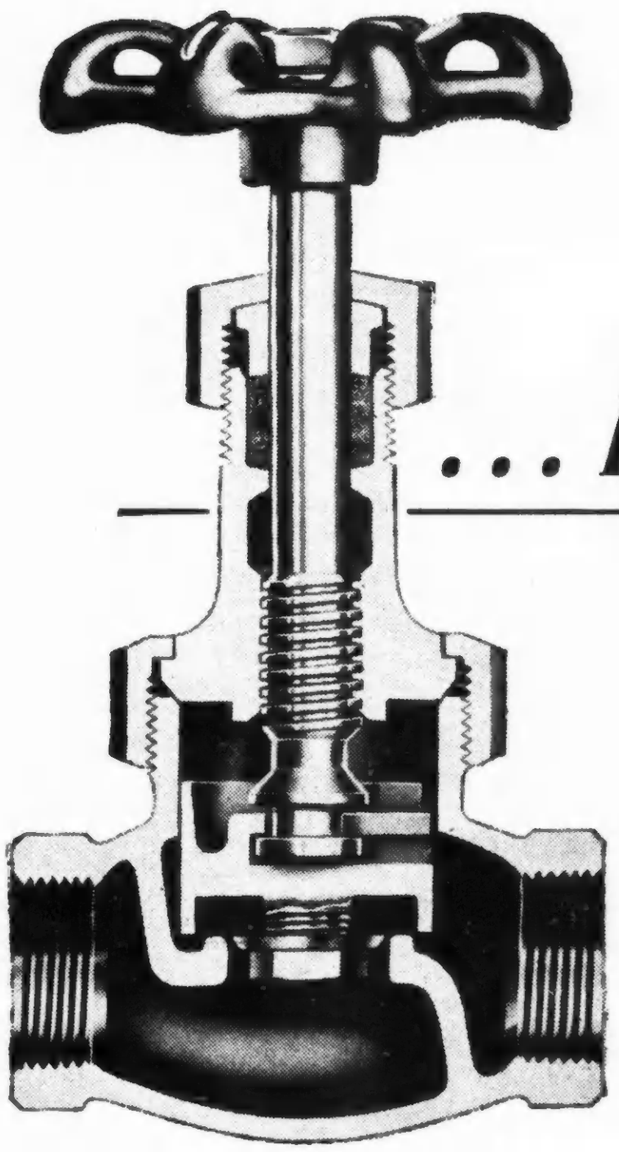

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AMERICAN REPUBLICS CORP. was due to start work about the middle of October on 22 miles of gas and crude oil lines near Silsbee, Texas. Latex had the contract with O. R. Mitchell as spread superintendent.

EL PASO NATURAL GAS CO. reported six major projects under construction. On the 26-in. loop from Jal, N.M., to Blythe, Calif., 116 miles had been completed by Oct. 1 with total project completion scheduled for April 1950. Total length is 629 miles. Of a total 95 miles of 20- and 24-in. line from Benedum field, Texas, to Keystone main line plant near Kermit, Texas, 50 miles had been laid and completion was scheduled before Nov. 1. On its 106-mile, 30-in. line from Salome, Ariz., to Needles, Calif., work is to be completed next April. Work was also progressing on a 76-mile line from White Sands proving ground, N.M., to Holloman air base and Alamagordo. A 10-in. loop line running 11 miles to Phoenix was completed in September, and the company expected to complete this month 27 miles of 16-in. loop along a 14-in. line from its Fullerton plant to its transfer line.

RICHMOND (KY.) WATER & GAS CO. expected to complete in November additions to its present gas system and seven new regulator stations under contract to Modern Welding Co. Inc., Owensboro, Ky., with D. D. Foreman as superintendent.

UNITED GAS PIPE LINE CO., Shreveport, completed in September 90 miles of 20-in. line from Baxterville field to Mobile, Ala., and 70 miles of 20-in. line from Pettus to San Antonio. O. C. Whitaker Co. and Brown & Root Inc. contracted the two jobs. The first will up deliveries to the Mobile-Pensacola area by 100 MMcf per day, more than doubling the previous 60 MMcf going to the area.

LONE STAR GAS CO., Dallas, is laying 250 miles of 10- and 8-in. pipe from Pottsville field to Kerrville, Texas. A spread located at the north end of the line near Pottsville field laid approximately 19 miles of line during a 30-day period ending early in October, while the second spread at the south end laid about 21 miles in the same period. The line is scheduled to be finished Dec. 15.

TRANSCONTINENTAL GAS PIPE LINE CORP., on its Texas-to-New York line, has Midwest Constructors Inc., Tulsa, working on 216 miles of 30-in. line from Demopolis, Ala., to Newnan, Ga. One section of this stretch was 90% complete; the other section was 15% complete early in October. Bill Wilhite is bossing both jobs.

TEXAS EASTERN TRANSMISSION CORP., Houston, has Associated Pipeline Contractors Inc., Houston, working on 36.28 miles of 20-in. line from Castor to Lisbon, La. Right-of-way and clearing began several weeks ago and completion of the section is scheduled for Dec. 1. J. A. Williamson is general superintendent. This section will loop the Little Big Inch from Station E.

TEXAS GAS TRANSMISSION CORP. had Midwestern Constructors' spread No. 10 working on 80 miles of 26-in. line in Jefferson county, Ind., and Warren county, Ohio, as well as a multiple river crossing over Green river near Slaughters, Ky. The job was reported 50% complete in early October. Latex Construction Co. started work late in September on the two 16-in. lines crossing the Red river near Curtis, La. R. Carl Stanley and Leroy Jackson had charge of the Midwestern job, while H. E. Murphy headed the Latex portion.

THE MANUFACTURER'S LIGHT & HEAT CO., Pittsburgh, expected to complete by October's end two short 20-in. lines in Washington county, Pa., with Britton Contracting Co. doing the work.

HOME GAS CO. has Williams Bros. Corp., Tulsa, at work on 23.5 miles of 12-in. line from Port Jervis to Cochecton, N. Y., and 30.3 miles of 10-in. and 17.8 miles of 8-in. from Port Jervis to West Nyack, N. Y. Completion is set for this month.

SOUTHERN NATURAL GAS CO., Birmingham, Ala., has just started work on a 12-in. river crossing over the Chattahoochie river at Columbus, Ga., with F. W. Johnson superintendent.

MICHIGAN-WISCONSIN PIPE LINE CO. now expects completion of its big line in December, 1950. On Spread 1, 156 miles is lowered in; on Spread 2, 148 miles; Spread 3, 182 miles; Spread 4, 105. J. R. Horrigan is contractor.

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